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Contributions.

A Possible Field for Speculative Americans.

ROLLA, Mo., April 7.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Two treaties have just been signed by the representatives of Colombia and Venezuela, the influence of which on the future development of northern South America may be very important. One of these is an alliance offensive and defensive, between the respective countries to endure for twenty years; while the other, which really means more than the first, establishes free trade between them. These nations are also endeavoring to enter into similar relations with Ecuador, and it is stated that the ultimate purpose of the statesmen directing the negotiations is to confederate the three republics under one government, thus reviving the political union which had been effected by Bolivar after the war of independence.

An examination of the map will reveal the existence of some remarkable geographic features which link these countries together, and which in the end would almost certainly lead to commerce triumphing over political boundaries through its irresistible tendency to follow the lines of least resistance. The area in question naturally divides itself into two sections—the first, triangular in shape, bounded on the north by the Caribbean Sea, on the west by the Magdalena River, navigable some 600 miles southward to Honda, and on the south by the Orinoco and its tributary, the Meta, navigable to within 125 miles of Bogotá, the capital of Colombia. This triangular region is indented in its wider part by the great gulf of Maracaibo, into which empty streams navigable for considerable distances. Here is an area of about 250,000 square miles of marvellously fertile lands, in which there is no point more than 100 miles distant in a direct line from navigable water. Under such conditions the removal of political barriers to trade, if accompanied with protection to the rights of property, must lead to a great industrial development, and here we may find a field for profitable railroad construction.

The second section is that beginning at the point where the Cauca River empties into the Magdalena, following up the Cauca Valley to Popayán, and southward through the inter-Andean valleys of Ecuador to the Cuenca basin, on the frontiers of Peru. The Intercontinental Railroad Commission has surveyed a route along this line, following approximately the course of the Camino Real, or king's highway of Colonial days, by which the products of Ecuador, Peru and what is now Bolivia were to a large extent transported to Cartagena for shipment to Spain. This long line of valleys and plateaux, rising from the lower hot districts of Colombia in the north to the temperate climate of the Ecuadorian tableland, has no natural outlet to the sea, and, although there exist a few passes through the mountains of no great altitude, the markets for the products of this region lie to the north, and with railroad facilities the

direction of trade would be along the axis of the valleys rather than westwardly to the Pacific.

Another important circumstance is the absence of good ports on the Pacific Coast Line, Guayaquil being the only one suitable for extensive commerce, and the difficulties of the pass over the mountains between this point and Quito are so great as to impose permanent disabilities upon commerce attempting this route. On the north, however, is the magnificent port of Cartagena, one of the best in the New World. In spite of the hardships of mountain travel there is already a quite important trade flowing north and south between Ecuador and Colombia, confined to the inter-Andean valleys. A political union, if only a permanent customs union, between these three republics would perhaps open a new field to American railroad enterprise. DE K.

A Method of Calculating the Greatest Stresses in Certain Main Rods When Used on Locomotives.

BY GEORGE H. GOODELL.

[The writer desires to acknowledge his indebtedness to Professor Gaetano Lanza, of the Massachusetts Institute of Technology, for some very valuable notes upon stresses in main rods which form the nucleus of this article.]

The most common form of main rod used on locomotives has a varying rectangular cross-section. The thickness of the body of the rod, or the width of cross-section between stub ends, is generally constant, and the depth of section between stub ends generally varies directly as the distance from the axis of the crosshead pin to the section under consideration.

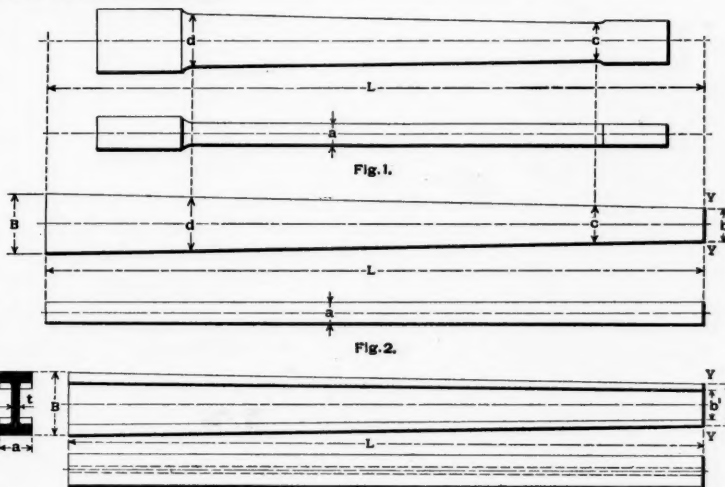
Let Fig. 1 represent the body of such a rod, and let Fig. 2 represent a nearly equivalent rod having the thickness and the rate of divergence of top and bottom surfaces uniform throughout its length. Moreover, let the length of the rod shown by Fig. 2 be the distance between center of crank pin and center of crosshead pin when the engine is in working order. It will be assumed that the masses of the straps and brasses are symmetrically disposed about the crank and crosshead pins so that they are balanced and, therefore, that these masses induce no bending action in the rod. Let the dimensions of the rod in inches be represented by the letters in Fig. 2, which letters need no other definition.

The weight of the rod illustrated by Fig. 2, if made of wrought iron or steel, is

$$W = \frac{.28 a L (B + b)}{2} \\ = .14 a L (B + b).$$

The distance from the crank end to the center of gravity is

$$\frac{L}{3} \left(1 + \frac{b}{B + b} \right).$$



Locomotive Main Rods.

Therefore, the distance from the crosshead end to the center of gravity is

$$x_0 = L - \frac{L}{3} \left(1 + \frac{b}{B + b} \right) \\ = L \left[\frac{2}{3} - \frac{b}{3(B + b)} \right].$$

The moment of inertia of the elevation of the rod about the axis Y Y is

$$I_n = \frac{B L^3}{3} + \frac{(B - b) L^3}{4} \\ = \frac{b L^3}{12} \left(1 + \frac{3B}{b} \right)$$

and this may be considered to be the polar moment of inertia of the elevation of the rod about the axis of the crosshead pin. Hence, the distance from the axis of the crosshead pin to the center of percussion is

$$l = \frac{I_n}{A x_0},$$

in which $A = L \left(\frac{B + b}{2} \right)$, the area of the elevation or side of the rod.

The weight of the crank end of the rod is

$$C = \frac{x_0}{L} .14 a L (B + b) \\ = .14 a x_0 (B + b).$$

The greatest throw of the rod which produces bending in itself occurs when the crank-pin is about in its highest and lowest positions, and is

$$T = \frac{C}{g} \left(\frac{S V 5280}{D 3600} \right)^2 \frac{24}{S} \\ = 51.6267 \frac{C S V^2}{g D^3},$$

in which

S = stroke of piston in inches,

V = speed of engine in miles per hour,

D = diameter of driving wheels in inches,

and g = the acceleration due to gravity, = 32.2 ft.

Hence, the rod may be considered to be a beam bearing a distributed load, the resultant, T , of which acts at a distance l inches from the axis of the crosshead pin.

The supporting force at the crank end is $\frac{l}{L} T$, and the supporting force at the crosshead end is $\frac{L-l}{L} T$.

The bending moment at a section e inches from the crosshead end is equal to the moment of the supporting force at the crosshead end about the neutral axis of the section, minus the moment of the vertical force of the portion of the rod between the section under consideration and the crosshead end. The former moment is $\frac{e T (L-l)}{L}$. The latter moment may found as follows:

Let the point of intersection of the axis of the crosshead pin with the axis of the rod be the origin, and let w be the weight per unit of length of the rod at the distance x inches from the origin. Then $\frac{w}{g} dx$ is the mass of an elementary section or differential of the rod at a distance x inches from the origin. The greatest vertical throw of this element of the rod would be $51.6267 \frac{S V^2 w dx}{D^3 g}$ if its mass were concentrated at the center of the crank pin; that is if it were L inches from the crosshead pin. But it is x inches from the crosshead pin, and, therefore, its throw is $\frac{x}{L}$ times as great as it would be if it were concentrated at the crank pin. Hence, the actual greatest throw of the element is

$$51.6267 \frac{w S V^2}{g D^3 L} x dx,$$

and the moment of its throw about a section e inches from the crosshead end is

$$51.6267 \frac{w S V^2}{g D^3 L} x (e - x) dx.$$

Now w is variable, and is a function of x , because the depth of the rod varies directly as x , and, therefore, w must be expressed in terms of x before integration can be performed. In the length L , the depth of the rod increases from b to B , or the increase in depth per inch of length is $\frac{B-b}{L}$ inches in passing along the rod away from the crosshead end.

Then $w = .28 a \left(b + \frac{B-b}{L} x \right)$.

Therefore, the moment of the throw of an element of the rod at the distance x inches from the crosshead pin about a section e inches from the same pin is

$$.28 \cdot 51.6267 \frac{a S V^2}{g D^3 L} (e x - x^2) \left(b + \frac{B-b}{L} x \right) dx \\ = 14.4555 \frac{a S V^2}{g D^3 L} \left[e b x + \frac{e x^2 (B-b)}{L} - b x^2 - \frac{B-b}{L} x^3 \right] dx.$$

Hence the moment of the throw of the portion of the rod between the section e inches from the crosshead end and that end is

$$14.4555 \frac{a S V^2}{g D^3 L} \int_0^e \left[e b x + \frac{e x^2 (B-b)}{L} - b x^2 - \frac{B-b}{L} x^3 \right] dx \\ = 14.4555 \frac{a S V^2}{g D^3 L} \left(\frac{B-b}{12 L} e^4 + \frac{b e^5}{5} \right).$$

Whence it appears that the bending moment at a section e inches from the crosshead pin is

$$\frac{e T (L-l)}{L} - .03741 \frac{a S V^2}{D^3 L^2} \left[(B-b) e^4 + 2 b L e^3 \right],$$

which reduces to an expression of the general form $F e - G e^3 - H e^4$, in which F , G and H are numerical coefficients, the values of which are dependent upon the dimensions of the rod.

The intensity of stress produced by this bending moment in the outside fibres is

$$Q = \frac{6 (F e - G e^3 - H e^4)}{a \left(b + \frac{B-b}{L} e \right)^2},$$

and the stress produced at this section by the direct thrust, or pull, is

$$R = \frac{P}{a \left(b + \frac{B-b}{L} e \right)},$$

in which P is the component of the force due to the pressure on the piston, which is transmitted to the rod by the crosshead pin, acting along the axis of the rod.

Then the greatest intensity of stress at the section which is e inches from the axis of the crosshead pin is

$$Q + R = \frac{6(Fe - Ge^3 - He^4) + P\left(b + \frac{B-b}{L}e\right)}{a\left(b + \frac{B-b}{L}e\right)^2} = f.$$

To find the location of the section at which f is a maximum, we must find the value of e which makes f a maximum. This may be accomplished by making the first differential coefficient of f with respect to e (that is $\frac{df}{de}$) equal to zero, and solving the equation for the value

of e . $\frac{df}{de} = 0$ will be an equation of the fourth degree, and, in general, cannot be solved by any direct process. The work should be carried along with numerical coefficients of e , and when the equation $\frac{df}{de} = 0$ is obtained, the value of e may be found by trial. After a little experience the value of e may be obtained very nearly by three or four trials.

The foregoing work is general, and applies to rods of rectangular cross-section, uniform thickness, and depth increasing uniformly as the distance from the axis of the crosshead-pin increases.

That the special case of a rod of uniform rectangular cross-section is covered by the general equations may be shown by the following substitutions. In this case

$$x_0 = \frac{L}{2}, B = b, I_u = \frac{bL^3}{3}, A = Lb, l = \frac{1}{2}L, C =$$

$$.14abL = \frac{1}{2}\text{ weight of rod, and } T = 7.2777 \frac{abLSV^2}{gD^2}.$$

Considering the rod as a beam, the supporting force at the crank end is $\frac{3}{2}T$, and the supporting force at the crosshead end is $\frac{1}{2}T$. The moment of the throw of the portion of the rod between a section e inches from the crosshead end and that end becomes

$$\frac{14.4555abSV^2e^3}{6gD^2L},$$

and the general expression for the bending moment at the section which is e inches from the crosshead end becomes

$$\frac{Te}{3} - \frac{14.4555abSV^2}{12gD^2L^2}(2bLe^3) = \frac{14.4555abSV^2}{6gD^2}\left(Le - \frac{e^3}{L}\right),$$

$$\text{whence } f = \frac{6\left[\frac{14.4555abSV^2}{6gD^2}\left(Le - \frac{e^3}{L}\right)\right]}{ab^2} \cdot \frac{P}{ab}$$

$$\text{and } \frac{df}{de} = \frac{14.4555abSV^2}{ab^2gD^2}\left(L - \frac{3e^2}{L}\right).$$

By making $\frac{df}{de} = 0$, we have

$$L^2 - 3e^2 = 0,$$

whence

$$e = \frac{L}{\sqrt{3}} = .5773L.$$

If we substitute $.5773L$ for e in the expression for f , given above, we have

$$f = \frac{14.4555abSV^2}{gD^2L} \cdot \frac{.5773L^3 - .1924L^3}{ab} + \frac{Pb}{ab} = \frac{.1728aSL^3}{abD^2} + \frac{P}{ab}.$$

By making the proper modifications, the general formulae already deduced may be made to apply to certain main rods of I-section, having flanges and webs of uniform thicknesses.

For example, let the dimensions of the rod in inches be represented by the letters in Fig. 3, which letters need no other definition. Also, let $a^1 = a - t$, and t = thickness of web in inches. Then the weight of rod = $14L[a(B+b) - a^1(B^1+b^1)]$. The distance from the crank end to the center of gravity is

$$L - x_0 = \frac{L}{3}\left(1 + \frac{b}{B+b}\right)\left[\frac{.28aL(B+b)}{2}\right] - \frac{.14L[a(B+b) - a^1(B^1+b^1)]}{a^1(B^1+b^1)} = \frac{L}{3}\left(1 + \frac{b^1}{B^1+b^1}\right)\left[\frac{.28a^1L(B^1+b^1)}{2}\right] = \frac{L}{3}\left[\frac{a(B+2b) - a^1(B^1+2b^1)}{a(B+b) - a^1(B^1+b^1)}\right]$$

The distance from the axis of the crosshead pin to the center of gravity of the rod is

$$x_0 = L - \frac{L}{3}\left[\frac{a(B+2b) - a^1(B^1+2b^1)}{a(B+b) - a^1(B^1+b^1)}\right] I_u = \frac{b^1L^3}{12}\left(1 + \frac{3B^1}{b^1}\right) + \frac{a}{a-a^1}\frac{(b-b^1)L^3}{12}\left[1 + \frac{3(B-B^1)}{b-b^1}\right]$$

$$A = L\left[\frac{B^1+b^1}{2} + \left(\frac{B-B^1+b-b^1}{2}\right)\frac{a}{a-a^1}\right]$$

$$l = \frac{I_u}{Ax_0}$$

The weight of crank end is

$$C = \frac{\text{Weight of rod} \times x_0}{L}$$

$$T = 51.6267 \frac{CSV^2}{gD^3}$$

The moment of the throw of an elementary section of the rod x inches from the crosshead end about a section e inches from the crosshead end is

$$51.6267 \frac{wSV^2}{gD^2L} x(e-x)dx.$$

The expression for w , the weight per unit of length, becomes

$$.38\left[a\left(b + \frac{B-b}{L}x\right) - a^1\left(b^1 + \frac{B^1-b^1}{L}x\right)\right] = .38\left[ab - a^1b^1 + \frac{a(B-b) - a^1(B^1-b^1)}{L}x\right].$$

Therefore, the expression for the moment of the throw of the elementary portion of the rod about a section e inches from the crosshead end is

$$.28 \cdot 51.6267 \frac{SV^2}{gD^2L}(ex - x^2)\left[ab - a^1b^1 + \frac{a(B-b) - a^1(B^1-b^1)}{L}x\right]dx = 14.555 \frac{SV^2}{gD^2L}\left[ex(ab - a^1b^1) - ex^2 \frac{a(B-b) - a^1(B^1-b^1)}{L} - x^3 \frac{a(B-b) - a^1(B^1-b^1)}{L}x^2\right]dx.$$

The expression for the moment about the section e inches from the crosshead end of the throw of the portion of the rod between that section and the crosshead end may be found by integrating the preceding expression, and is

$$14.4555 \frac{SV^2}{gD^2L}\left[\frac{a(B-b) - a^1(B^1-b^1)}{12L}e^4 + \frac{ab - a^1b^1}{6}e^3\right],$$

which is of the general form $Ge^3 + He^4$.

The bending moment at a section e inches from the crosshead end is

$$\frac{eT(L-l)}{L} - .03741 \frac{SV^2}{D^2L^2}\left[e^4\left\{a(B-b) - a^1(B^1-b^1)\right\} + 2(ab - a^1b^1)L e^3\right],$$

which is an expression of the general form

$$Fe - Ge^3 - He^4.$$

$$Q = \frac{6(Fe - Ge^3 - He^4)\left(b + \frac{B-b}{L}e\right)}{a\left(b + \frac{B-b}{L}e\right)^2 - a^1\left(b^1 + \frac{B^1-b^1}{L}e\right)^2}$$

and $f = Q + R$

$$= Q + \frac{P}{a\left(b + \frac{B-b}{L}e\right) - a^1\left(b^1 + \frac{B^1-b^1}{L}e\right)}.$$

To find the distance from the crosshead end to the section at which f is a maximum, proceed as previously explained.

American Railway Association.

The semi-annual meeting of the American Railway Association was held at Richmond, Va., April 7, President E. T. D. Myers in the chair. Eighty roads were represented by 125 delegates. The date agreed upon for the general change in time-tables is May 16.

The Safety Appliances Committee made a report giving definitions to be used in signaling (with interlocked signals) and the requisites for the installation of interlocking apparatus for switches and signals. This report was discussed at length and, at the request of the committee, referred back.

The Conference Committee, made up from the committees on train rules, on safety appliances and on general regulations, made a report containing 12 general rules to precede all the other rules in the Standard Code. This report was accepted, and the next authorized edition of the Standard Code, to be issued by Secretary Allen will contain these 12 rules.

The committee on standard wheel and track gages reported that the letter ballot which was ordered at the October meeting approved 4 ft. 8½ in. as the standard track gage, the vote being 195 roads in favor, 27 against and 20 not voting. By mileage the vote stands 139,946 miles, 16,231 miles and 4,493 miles. The committee therefore offered a resolution, which was adopted, to the effect,

That 4 ft. 8½ in. shall, hereafter, be the standard gage of all tracks owned by the railroad companies forming this Association. This gage shall be the shortest dis-

tance measured between the inside of the heads of the two rails forming the track; and

That the standard distance between the main rail and guard rail and in the throat of all frogs be 1½ in., for all tracks of the standard gage.

It was also resolved,

That the question of wheel gages, in view of the adoption of one standard track gage, be recommended for reconsideration to the Master Car Builders' Association; and that the committee on Standard Wheel and Track Gages be authorized to ascertain by circular from the members of this Association what the practice of the various railroads is in the treatment of the gage on curves; how much, if any, is the gage increased; by what ratio and what is the guiding reason for such increase and ratio.

In view of the action taken by Congress at its last session on the proposed law to legalize the metric system in this country, the President was directed to appoint a committee of five persons to consider the whole subject and report upon it to the Association.

The recent death of Mr. K. H. Wade, a prominent member of the Association, was spoken of by the President, and eulogistic remarks were made by President Myers, Mr. Pitcairn, Mr. Bradley, Mr. G. W. Stevens and Mr. Leighton.

The next meeting of the Association will be held in New York City, Oct. 6.

The election of officers resulted in the re-election of the present incumbents, except that C. W. Bradley (West Shore) was chosen Second Vice-President in place of Joseph Wood. Theodore N. Ely (Pennsylvania) and George R. Brown (Fall Brook) were elected members of the Executive Committee. The election of companies as members of the committees on train rules and on general regulations for employees resulted in the retention of the present incumbents, except that the Pennsylvania takes the place of the Southern on the last named committee and the Canadian Pacific takes the place of the Lake Shore on the Train Rule Committee. Col. H. S. Haines, the well-known ex-President of the Association, was elected an honorary member of the Association, being the first person to receive that honor.

On the day following the convention the delegates, accompanied by the wives of many of them, visited the Richmond Locomotive and Machine Works and took a trip over the Chesapeake & Ohio to Newport News and Old Point Comfort.

A Bridge Accident.

Telegraphic reports were published last week of the fall of a part of the timber approach to the Ohio Connecting bridge (at Pittsburgh) under a freight train. We have endeavored to get the exact facts concerning this accident and are informed that investigations all point to a broken axle under the second car of the train as the probable cause of this accident. The structure was a Howe truss of 66 ft., clear span, on timber abutments and with trestle approaches. The evidence collected is to the effect, that when the engine, which was pulling a train of 40 cars, had passed the bridge, there was a sudden stoppage of the train, and one eye-witness says that the ends of the two cars then on the bridge rose up and dropped back, after which the bridge gave way and the cars were carried down, the engine being dragged back into the gap.

In clearing away the debris the broken timbers were found to be perfectly sound. No evidence of weakness of the structure has been developed, but at the bottom of the debris a broken axle was found detached from its truck, the axle being broken midway between the wheels and entirely free from any bend or bruise to indicate that this fracture was the result of violence during the wreck. The bridge was a little over five years old, and was, as already stated, in good condition.

Piece-Work in Car Repairs.

We give below a few extracts from a report on "Piece work in Car Repairs" presented at the April meeting of the Central Railway Club. The committee consisted of Messrs. H. C. McCarty, Thomas Anderson, John S. Lentz and J. R. Petrie.

It should be understood that when establishing the piece-work system many details must be vigorously and patiently followed up, together with a careful consideration of the facilities and locality where the work is to be performed. An equitable rate at one point cannot be understood or accepted as a proper one for another point, or on another railroad. This point is especially referred to, as it is believed that adverse opinions have been formed on the piece-work system by the use of rats developed by others in locations where the conditions and facilities greatly differed, which, in many cases, would develop injustices to the men or the employer.

The introduction of the piece-work system necessitates radical changes in the average shop practice and supervision. The duties of the foreman are at once changed from specially seeing that the men are employed to a most critical observation of the character of the work performed. In addition to the special duty of the foreman it is necessary to employ a competent piece-work inspector to assist the foreman. Where this system has been followed up carefully for any period, very desirable advantages have been developed both for the men and the employer.

The piece-work system practically first results in a complete solution of the question of proper compensation for each workman, as the rate paid each individual is actually established by him. The effect of the piece-work system at once engages the interest of the workmen and he therefore resorts to his ingenuity and tact which enables him to perform many duties with greater speed and ease. It will thus be observed that each workman practically establishes his earning capacity, which has been a great satisfaction to him, and this consideration is justly due the workmen of the present age.

As for the employers, their interests are likewise ad-

vanced by the personal exertion and tact of each workman and the possible fluctuations of demands are more easily met; and during a normal stage of business the earning capacity of men in eight hours exceeds the old system of rates for ten hours in many cases, the advantage of which is apparent to both workman and employer.

It would be well to state that the piece-work system has been in active operation since 1876 on certain railroads; this fact is mentioned to show that it is not in an experimental stage, but long since established as a wise policy. While there is some increase in stationery and clerical work, the additions, however, are very small in comparison with the saving effected through the introduction of piece-work.

In conclusion, therefore, your committee considers the "Piece-work System for Car Repairs" a desirable method to follow, and recommends its consideration to those who have not already taken it up.

A Power-Feed, Automatic, Weighing Machine.

The automatic weighing of materials being a problem the solution of which is of considerable importance in a wide variety of uses, it is not surprising to learn that several hundred patents have already been taken out, covering various machines for accomplishing this purpose. About one-half of these patents are held by a single company, and the latest type of power-feed machine, made under these patents, is so accurate in its operation and illustrates so well this branch in the development of automatic machinery that a description of it cannot fail to be of interest.

The machine in question is made by the Pratt & Whitney Co., of Hartford, Conn., and is one of a series which has recently been developed by the manufacturer from the designs of the inventor, Mr. Francis H. Richards, of Hartford and New York, who has also to a large extent personally supervised the work, which was begun some three years ago. The patents already

both the conveyor and the disintegrator, when the machine is fitted with the latter device.

The beam mechanism comprises two oppositely disposed beams, carried on self-adjusting bearings set in the base of the machine, this arrangement being made so that all parts affecting the alignment of the weighing mechanism proper are mounted on a single casting. The counterbalancing portion of the beams is in the form of a shaft extending almost the length of the machine, and connecting the beam-arms, or levers, which directly carry the bucket. These two beams are also connected at one end by a link, making them operate in unison. One of the beams is provided with a graduated arm, extending across one end of the machine, and carrying the main load-weight. When this load-weight is slid outward, on the graduated arm, it acts to counterbalance the shaft on the beams, A, Fig. 1, and thus the empty bucket may be accurately poised (as is done when setting the machine preparatory to testing the same). When the load-weight is slid along the bar toward the opposite end, its effect is added to that of the beam proper, for counterbalancing the loaded bucket.

The material is supplied to the machine through the hopper, B, under which is the conveyor belt. This belt is a series of bars, pivotally supported on a pair of chains that are carried by shafts mounted in the top frame of the machine. On the upper run of the conveyor these bars lie close together, so as to form a continuous surface for supporting the stream of material. On passing downward over the forward end of the conveyor, the bars open, so as to discharge into the bucket any material which would otherwise gradually accumulate between the conveyor bars, and thus in time seriously interfere with the operation of the machine.

forward end of the conveyor. This instantly catches the last part of the drip-stream, preventing it from going into the bucket. The same operation shifts the driving belt from the slow-speed pulley to the idle pulley, P, and thus entirely stops, for the moment, the operation of the conveyor.

In the operation of the feed mechanism the disintegrating device remains at rest during the first part of the loading operation. This device is operated by a connecting rod, Q, from an eccentric, connected, by a tubular shaft through the pulley, P, with the slow-moving pulley, M. In this way the disintegrator is operated only during the slow movement of the conveyor. Its purpose is to properly loosen up the stream of material during the drip-period of the loading operation. The fingers of the disintegrator are held against the stream of material by light weights, these fingers being so designed and weighted as to suit the particular material to be weighed. Very hard lumps will throw the disintegrator fingers forward, out of the stream. In handling some materials this device is not necessary. One of the materials for which the power-feed mechanism and the disintegrator are much used is cottonseed meal, which is extremely variable in its character.

One of the important features of this machine is the poising mechanism, whereby the machine is adjusted to make allowance for the small amount of material which is always in the air, between the conveyor and the bucket, at the moment the weighing mechanism brings the bucket to a true poise. For offsetting this extra material, a small weight, R, is carried by a lever, and connected with the bucket mechanism, through the lever S and the support T.

For testing at any time the accurate working of the machine, the following mechanism comes into play. The

crank U operates a small rock-shaft, mounted on one of the uprights of the machine. This shaft has an arm on its inner end, connected, through the link, V, with the valve-rod, D, so that when the crank is shifted about one-eighth of a revolution, the arm on said shaft will operate to so far shift the valve-rod, D, as to throw this out of action with the load-discharging latch; this permits the machine to take its full load, and come to rest without discharging the load. The first movement, however, is not sufficient to shift the valve rod, D, out of engagement with the beam-mechanism. On further shifting the crank U, the connection just described will shift the valve-rod, D, to a position where said rod is entirely free of the beam mechanism, and at the same time lift the weight R free of the weighing mechanism. In this latter position the parts are so set that the loaded weighing mechanism may oscillate through its entire working stroke free of any obstruction and without the load being discharged. The operator may thus test the exact poise of a load at any time, thereby assuring himself as often as desired

that the machine is operating properly. An example of how the machine may gradually get out of poise is found in weighing such materials as coal (and even grain to a lesser extent), where the friction of the material on the plates of the bucket serves in time to wear away the metal and thus affect the true poise of the machine. When the poise has been observed, and, if necessary, corrected, the operator shifts the lever U back to its first position, thereby discharging the load and starting the machine working again.

The load is retained in the bucket by the door, usually called the "closer," at its lower end, this door being connected by rods, one at each end, with the rock-shaft W. This shaft is also called the interlock shaft, since it carries one of the stop segments of the interlocking mechanism. This interlocking mechanism is a system of stops, operating between the supply mechanism and the bucket-closer mechanism in such a manner that both of these mechanisms cannot be in operation at the same time. The segment mentioned above is provided with a latch arm, engaging with the closer latch, X. The load is discharged by the momentum of the supply valve operating through the valve rod D, a projection, Y, thereon, striking an arm, Z, of said latch, X. It will be observed that the closer rods, Z, connect with the arms of the interlock shaft at a point near the dead center above that shaft. Thus a slight resistance to the turning of the shaft effectually holds the relatively large closer fully shut.

These machines are not ordinarily used to weigh loads less than one-third the maximum bucket-load. If smaller

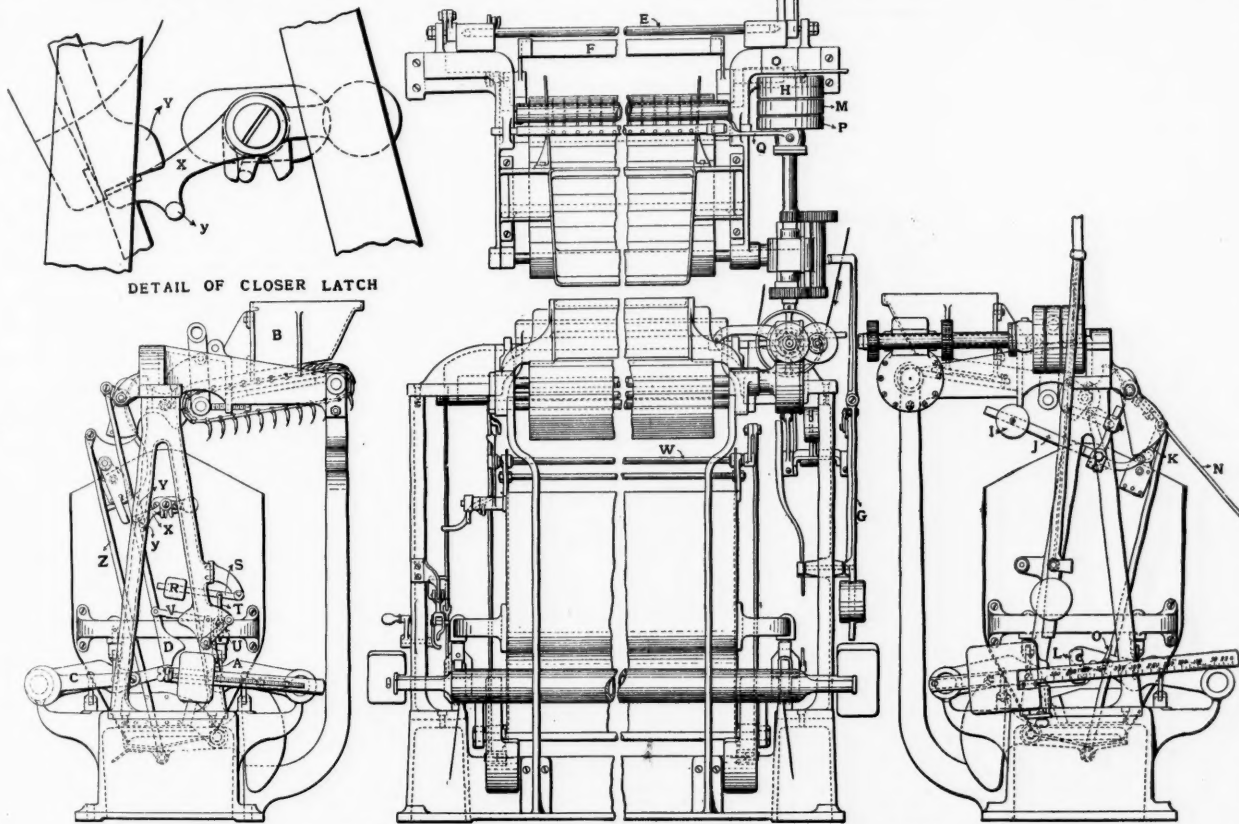


Fig. 1.—The Richards Power Feed, Automatic, Weighing Machine—Pratt & Whitney Co.

issued for protecting this line of machines number more than 100, comprising about 450 sheets of drawings and over 2,000 claims, some 240 of which relate to the particular machine we are describing, making this one of the most strongly protected mechanical inventions recently put upon the market.

The result is an automatic power-feed machine, which combines to an unusual extent the two great essentials in such devices, namely, accuracy and speed. The variation in ordinary practice, weighing such materials as grain, for instance, is extremely small, and will seldom exceed one-half an ounce per bushel, being much more accurate on an average than ordinary scales operated by the professional weigh-masters.

Machines having the power-feed mechanism are of particular value in weighing a great variety of materials which do not run freely. Where several materials are to be mixed or blended, as in the manufacture of cement, and blending different varieties of wheat, two or more machines are connected for operating in unison, each machine being arranged to weigh out and deliver its part of the mixture, the smaller machine after taking its individual load waiting until the machine taking the greatest load has reached a balance, when all are discharged simultaneously.

The entire mechanism is carried on a rectangular base, and comprises the beam mechanism, the load receptacle or bucket, carried on the beams, the poising mechanism for regulating and testing at will the accurate operation of the machine, the conveyor for supplying the material to the bucket and the power mechanism for operating

The conveyor is operated through a system of gearing from a set of pulleys and a single belt, this belt being shiftable from one pulley to another by connections operated from the weighing mechanism. In the operation of the machine, the emptying of the bucket permitting it to rise operates through the lever, C, and the valve operating rod, D, to turn the shaft, E, thereby opening the drip-valve, F, and at the same time, through the necessary connections, operating the belt-shifter lever, G. This shifts the power belt on to the pulley, H, which, being the high-speed pulley, operates the conveyor to supply the material to the bucket rapidly during the first part of the loading.

When the bucket has received the larger part of its load, the weight of this partial load, together with the action of the weight, I (through lever, J; cam, K; shaft, L, and valve-rod, D), operates to bear down the beam arm, thus carrying the bucket downward a portion of its stroke, and thereby shifting the driving belt on to the slow-speed pulley, M, thus reducing the conveyor speed and delivering the material in a small stream, and thereby obtaining a nice balance.

During this period of the loading operation, the long arm, N, called the drip-lever, rests against the drip-lever latch, O, carried on the extended arm of one of the beams, so as to have a relatively rapid downward movement, as compared with the bucket. When the bucket load is completed, lowering the bucket very slightly the latch, O, is carried below the arm, N, thus permitting the weighted lever, J, operating through its connections, to suddenly close the cut-off valve under the

loads than this are used with any given machine, it becomes necessary to use a smaller feeder stream and more delicate valve mechanism, and also to operate the machine more slowly. It is of course preferable to use a smaller-sized machine for small loads, if local conditions will permit. In connection with these machines is used the automatic register, shown in Fig. 2. This register is carried on one end of the bucket and is positively connected with the discharging mechanism of the bucket and the connection may be sealed. This counter has five dials. The first dial has a duplex driving mechanism, containing both a pawl-and-ratchet dial-actuator, and an escape-dial-driving device, which works in unison with the ratchet. In this way both absolute certainty of action and great lasting qualities are secured. The escape-dial not only limits the action of the other parts, preventing overthrow, but will itself operate the dials, should the pawl from any reason fail to act. For making this apparatus a plant has been especially constructed,



Fig. 2.

using the most approved methods of watch tool manufacture.

These weighing machines are also arranged to deliver into bags, and patents have been secured for machines adapted for weighing fluids. It has been suggested that such weighers may come into general use in power plants for weighing water for the boilers, in connection with fuel weighers, thus keeping a continuous record of the cost of operation, and affording a means of keeping a report of the efficiency of service of a plant. Fluid weighers could also be used in packing or dispensing oils, liquors, chemicals, etc.

Railroad men will be especially interested in knowing that the manufacturer proposes to adapt these weighing machines for use in transfer cars for re-shipping grain, whereby the grain may be taken from a car on one train and transferred to another car in another train, it being weighed during the operation. In this apparatus a pair of the weighing machines will be used so as to receive and discharge the grain alternately, and thus take care of a continuous stream. These transfer cars will be equipped with their own motive power for operating the machinery and for moving the car itself from one point to another as occasion may require. The makers believe that with their new system of weighing machinery the transfer cars can be made entirely practicable, and that they will come into such general use as to materially modify the present system of shipping grain and greatly facilitate the handling of this crop.

Tests of a Wrought-Iron Car Axle.*

BY PROF. W. F. M. GOSS.

While much has been written concerning the variety and intensity of the stresses which service conditions impose upon car axles, there have been presented but few descriptions of the behavior of such axles when under stresses that are simple and definite in character. Interesting material of the latter class is supplied by a recent test of a 60,000-lb. axle made in the Engineering Laboratory of Purdue University.

The axle tested was supplied by the Bass Foundry and Machine Works, of Fort Wayne. It is said to have been made of No. 1 wrought railroad scrap and to have been selected at random from a lot of 100 which were being shipped to a railroad company, and with it there was delivered to the laboratory a small test specimen which

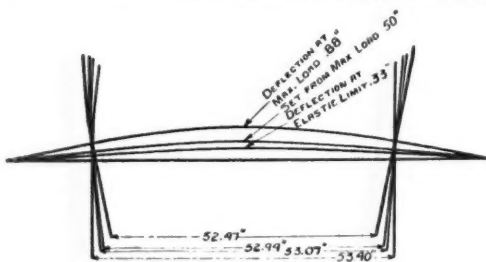


Fig. 2.—Changes of Gage for Deflection of Axle.

had been drawn down from the crop end of the axle. As prepared for the tests the axle carried two 33-in. cast wheels, and it was tested under transverse stresses, while the small specimen was subjected to tensional tests. The work was executed by Mr. J. H. Klepinger, who perfected details in the general plan and was painstaking in the manipulation of the apparatus.

The tests were made on a 300,000-lb. Riehle testing machine. The axle was supported by cast-iron blocks 4 in. in breadth, shaped to the form of a bearing and extending from the center to the outer end of the journal. The actual points of support were located in the center of

these blocks. Load was applied to the wheel treads through steel rollers, which at the beginning of the test were located 4 ft. 10 in. apart; that is, at a point corresponding to a position three-fourths of an inch outside of the inner or "gage face" of the rail upon which it may be supposed the wheels were set to run. In this manner stresses were imposed upon the axle which were in every way similar to those which might have been imposed by a car, if the axle had been in service, but, to give greater facility in testing, the usual order was reversed, the rails being assumed to be above the axle and the car below.

At each end of the axle there was attached a light arm, extending at right angles both to the axle and to the plane of the stresses to which it was subjected. Over these was stretched a fine wire parallel to the axis of the axle. The wire passed through the web of the wheels, in holes which were drilled for the purpose and made sufficiently large to give ample clearance. The whole length of the wire between the arms was at all times perfectly free, and the arrangement was such that although the axle might be bent by loads applied to it, the wire would remain straight. Three micrometers attached to blocks clamped about the axle served to locate the latter with reference to the wire, and thus to determine the deflection.† A fourth micrometer was used to measure distances between the wheel flanges in a line parallel with the axle and 16½ in. distant from its center.

Loads were applied from above in 5,000-lb. increments, and all micrometers were read before each change of load. In this way a maximum load of 85,000 lbs. was applied under which the axle showed unmistakable signs of failure, the elastic limit having been reached with a load of 55,000 lbs. The results are presented graphically by Fig. 1, in which the curve marked "center" represents the deflections of the center of the axle as determined by the middle micrometer; the curves marked "right" and "left" represent corresponding de-

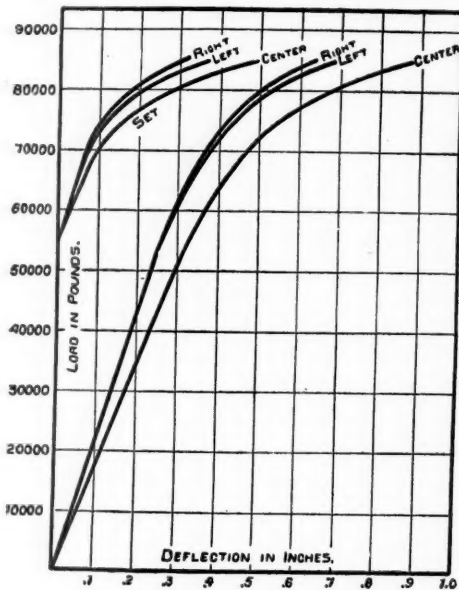


Fig. 1.—Strain Diagram of a Wrought-Iron Car Axle.

flections for points 18 in. either side of the center. Deflections of the axle involved changes in the gage of the wheels as measured above or below the axle, the extent of which is indicated by Fig. 2.

The dimensions of the axle were such that when loaded to its elastic limit, the maximum fiber stress at its center was 28,730; at 18 in. from the center 22,100 lbs., and at the neck of the journal 20,600 lbs.

The axle tested was designed for use under a freight car of 60,000 lbs. capacity, the car itself weighing about 20,000 lbs. Each of the four axles under such a loaded car, therefore, must withstand a static load of 20,000 lbs., which load would develop a maximum fiber stress in the center of the axle tested of 10,810 lbs. In comparing these values with those obtained in the tests, as given in the preceding paragraph, it is important to remember that the stresses to which car axles are subjected when in service arise from complicated conditions, and that their value cannot be determined from static conditions alone.

The test specimen which was forged down from the crop end of the axle was turned down in the center for a distance of 8.5 inches and tested under tension. The results are as follows:

Diameter in inches.....	1.875
Area of cross-section.....	2.755
Total load, pounds.....	140,700
Ultimate strength, pounds per square inch.....	51,070
Elastic limit.....	30,000
Modulus of elasticity.....	29,671,000
Area at point of fracture, per cent. of original area.....	61.6
Elongation in 8 in.....	27.3

Finally, one end of the test specimen was exposed to the action of acid, and the etching thus produced used in printing Fig. 3. This figure, therefore, shows the disposition and relative density of the various layers of

† One of these micrometers was placed in the center of the axle and the other two were located 18 in. from the center. The diameter of the axle at the center was 1½ in., at the point corresponding to the deflection marked "left" in Fig. 1 the diameter was 5¼ in., and on the right it was 5½ in.

iron composing the specimen. The symmetrical arrangement of curved lines, which is so noticeable, is due, evidently, to the hammering of the round section of the axle to a square section, in the process of forging the end of the axle down to the size of the test specimen. While the tests show the iron of the axle to have been of excellent quality, the most significant fact developed is that



Fig. 3.—Etching of Car Axle.

concerning the amount of distortion which such an axle will withstand, without taking a permanent set.

It would at first sight appear impossible that by loads applied at the journals a common car axle could be deflected at its center as much as a third of an inch without exceeding its elastic limit, but an analysis of the data given will fully justify such a conclusion. The results show also that a deflection of the axle well within the elastic limit of the material may be sufficient to produce a temporary change of gage in the wheels mounted upon it of quite three-tenths (0.3) of an inch.

Locomotive and Car Lubrication.*

The lubricant used on car journals, as also the conditions existing in all boxes and bearings, have a considerable influence in the tonnage hauled in trains, as well as on the expense of hauling them. I do not expect to make new points on the subject, or to state them as well as others have done, but I may be able to place the items which occur to me in a light different from that usually given, recent observations confirming the opinions herein expressed. The real cost, or entire cost, of lubrication does not, in every case, appear in figures which officials may readily see; nor is the whole cost always due to the quality of lubricant. My purpose is to note facts as I see them, and perhaps induce a change in the conventional line of thought on the subject.

The conditions for frictional development is much the greatest in cars and it varies mainly with the speed of trains. A question with many in railway practice, which, perhaps, may best be settled on a testing plant, is whether the increase of speed above 25 miles per hour affects engines and cars injuriously, or at all, in proportion to the speed. The best running trains, as a rule, are those at high speeds; these, however, receive the influence of extraordinary care and supervision and the value of this care is shown.

The best provision of bearing will be found in new car or truck axles, with journals full size and with bearings just a little larger than the journal, for a good prospect in starting in to wear to a bearing surface without heating. A car or truck bearing, fitted close, as is usual in the case of engine-driver boxes, will be certain to heat, unless made of yielding surfaces of white or soft metal. I have noticed, in repairs and at inspection stations, bearings which were much larger in diameter than was necessary, and, of course, this is decidedly wrong. No doubt a variety of sizes were properly supplied to inspectors to use on worn journals, which they neglected to properly assort for use. My custom was to examine these points very closely and in certain cases not to supply full-sized bearings in large quantities to inspectors. In the case of a worn journal it is difficult to fit a brass bearing to run cool at the start, even when the fitting is done at terminals, with all proper facilities provided for the work, and journals vary so in regard to wear that ordinary inspection often fails to discover faults; hence, in these renewals and changes, it is proper to use lead-lined, white or soft metal bearings when they are available.

In the use of plain brasses, and those of composite or fancy mixtures, it is at times found that the metals are not thoroughly well mixed in the melting. Undue haste in pouring or careless work, no doubt, is the cause, and trouble usually develops in such cases at the center of the bearing. Heating takes place gradually until, perhaps, after many miles running the bearing goes from good to bad very rapidly, and, perhaps, under the best possible condition of lubrication, a regular incurable hot-box is the result. If the bearing be broken or cut in halves the cause is in this case found to be a bad mixture of metals. It does not follow, however, that all cases of brasses sealing in spots are due to bad mixtures, for this may occur in the case of a foreign substance getting to the bearing surface and causing the local seizing, which produces the surface scale. Nor does it follow that, because of bad mixture the metals are bad in quality, as better treatment in remelting will probably produce a good bearing.

There are a number of faults which occur in the alignment of the trucks, which have a more or less injurious influence on the bearings and journals. The tipping of oil boxes is often found. I have noticed journals worn tapering more than ¼ in. in their diameter from this cause in both freight and passenger cars, and I have seen trucks so skewed out of line that the bearings were worn to knife edges at opposite diagonal corners. The journals were badly worn also, and new bearings were put in place with great difficulty. In passenger trucks using the usual form of pattern of spring bolster, the position of the bolster springs, as also the equalizer springs effect equalizers, giving to them at times an unequal bearing on the top of the oil boxes, and producing the same result on the journal bearings. Pedestals are also pushed outward affecting all other parts in due proportion. The

* From the April number of The Digest of Physical Tests and Laboratory Practice.

* Extracts from a paper by Mr. George W. Cushing, read at the February meeting of the Western Railway Club.

tipping of the oil box in turn tips the brass, wearing it unduly at the rear end and tapering the journal.

Another faulty and improper condition is a box or wedge bearing on the top of the brass at the center, which is so limited in extent as to place all the load at the center of the journal and wear a hollow journal. Again, in the case of a flat bearing or wedge, this may be cast so rough at one end or at the center as to make the same condition of hollow journal at the center or taper end.

It has been stated that brasses may be faulty in the mixtures of metals. This may also occur in white metals, but is troublesome in a much less degree, because of the difference in metals. White metals are usually made of lead and antimony, with perhaps an admixture of tin, as in the case of brasses treated as are the Hopkins lead-lined bearings, so successfully used in times past in passenger trucks. In the case of shell bearings the metal is lead and antimony. Experience with bearings of brass and composite metals has led me to favor the use of white metals, as mentioned above, because of less cost, and, because, also, these bearings readily adjust themselves to the ordinary condition of journals. They are much less liable to heat in getting a bearing in running, and there will be less wear of the journal and of the bearings at any speed, so long as the lubrication is attended to, and when not properly cared for the white metal will wear for itself much the longer. The white metal bearings will consume less oil per 1,000 miles run, and will remain in good condition with much less labor than plain brass bearings, and they are also good to have available when needed in emergency service, and as a preventive of train delays.

No doubt each inspector has his own plan for packing boxes and for the care for them in service. I will state as a matter of observation, that, while the best means of car lubrication is yet the old method of packing with waste, I find also, that the modern method of preparing waste for use and placing it in boxes has been adopted by most roads in the West. Waste is usually oil soaked for days, and in this state it is served out to workmen for packing boxes. Good lubrication depends to-day as much upon quality of oils and waste as formerly; and much more upon how the materials are used, and the state of the machinery, because of the increase of weight and speed.

In some experience on Western roads in the past, I have had some difficulty in the proper instruction of oilers and box packers—the common idea and practice being to punch the waste hard into the back of oil boxes and to continue the process until the boxes were filled. Of course, it is proper to entirely fill the oil box with waste at the rear and center, but the action of the axle in the motion of end play packs the waste to the rear, more or less, and this is most noticed with the M. C. B. collar journal. With collarless journals this is done but to a greatly less extent. I have generally advised filling the oil box with cotton waste, so that it will not fall away from the journal either at the end or center. The tendency of axles to pack waste to the rear may be noticed when the front of a box is found very well supplied with oil, and examination shows the waste packed so hard at the rear and center as to prevent the free flow of oil. Of course, if this state continues, there will soon be a warm box, and probably an undue wear at the back end of the brass.

When working upon my own system of operation, in approaching winter weather, I have practised removing all the old packing and oil, and repacking with fresh waste and the winter grade of oil, handling cars at terminals, or when at the shops for repairs, the winter oil, of course, having then come to be used generally on the whole line of the road. This gives an opportunity to clean out all the oil boxes thoroughly and also to destroy dirty and unsuitable waste which accumulates, the good waste being saved for use in replenishing the freight oil boxes in warm weather. The oil which is removed is also saved and the dirt and particles allowed to settle, and that portion of it which is suitable is used again in freight service in warm weather. This system is quite advantageous in the case of passenger car tracks and is good for either class of service. I first adopted the practice in the case of locomotives and it became indispensable in snow service.

I will further remark, only, in connection with winter lubrication, upon the beneficial effects experienced in a change in the grade of oil at the right time to one suitable for the season. Instances have occurred where a summer grade was used through the year. This custom, I consider, is a mistake, at least on roads of the North and West, and it greatly influences the cost as well as the practical results obtained. It has been the experience of many that a train taken to a siding and left standing there for a few hours with the temperature at or below zero could not be taken out again or moved by the same power, and a decrease of the weight of the train, leaving, perhaps, one-third, was necessary to insure the train being hauled over the district, where usually the full train was easily within the capacity of the engine.

Locomotive Lubrication.—The method of top-oiling locomotive journals is favorable to good work, not only because of the oil getting directly to the spot needed, but also for the attention in the operation of oiling which this insures, and by a thoroughly interested person, who is at all times alert for the discovery of any evidence of heating, and who is prompt to supply a needed remedy. This is the reason why there is, and ought to be, so little difficulty in the heating of journals of locomotives.

The oil and waste used in packing the engine boxes differ, of course, with the circumstances or experience governing the supply. My experience favors petroleum products for lubrication, and good wool packing in driving box cellars, with a mixture of wool and cotton waste on the top of the box as an oil pad, the latter being composed of wool and cotton. This should be used also for the engine truck bearings and the tender trucks of passenger engines, and plain cotton waste should be used in those of freight engines.

With the high pressure of steam now becoming general in simple locomotives of modern construction, there has been a disturbing idea developed in valve oiling. It is stated that there is a holding of oiling within the oil pipes, in the case of engines worked with a wide-open throttle and the valve cutting off about 20 per cent. of the piston stroke. Having been privileged to freely note certain of these engines in operation, I am led to suggest the singularity of a claim that attributes to a position of the "cut off" as affecting a free oiling of valves, other conditions being correct; and I also question its being a fault in any of the plain or triple feed oilers, as heretofore made and used. I should first be likely to examine thoroughly for an unsuitable piping of lubrication for which the makers are not responsible.

Any change decreasing the size of pipes of the piping system of oilers, or of their proper location, preventing the free flow of oil along the pipes in a constant and downward course, by reason of an upward turn of current, or by bad bends of pipe will pocket the oil and hold it back until the strength of draft at the steam chest

outlet increases enough to overcome it. Anything decreasing the pipe opening at any one point between or at the steam inlet valve on the boiler, and the oil outlet at the valve chest, will, I think, pocket the flow. With the original sight feed oilers and a boiler pressure of 130 lbs., there was no fault in the connecting up of piping $\frac{1}{8}$ inch inside diameter. A change to higher pressures with occasional complaints of trouble in operation of oilers induced their makers to issue "engineer's cards of directions," on which are printed in red ink, surrounding the steam inlet pipe shown on an engraving of the oiler, the following:

"This connecting pipe must not be less, under any circumstances, than $\frac{1}{8}$ -in. inside measurement."

The engraving showed an oil pipe leading from the oiler, larger than the steam pipe leading to it, and whether intentional or not, it is clear enough that there should not be a reduction in the size of the oil pipe below that of the steam pipe. With a boiler pressure of 180 to 200 lbs., the requirements in piping do not appear to be changed.

The steam pipe and fittings should not be less, I believe, than $\frac{1}{2}$ -in. inside measurement, and the oil pipe and fittings not less at any point than $\frac{1}{2}$ -in. inside measurement. The manufacturers make, within the oilers, suitable restrictions for the proper condensation of steam necessary for the oil flow regulation. Cylinder oilers are now supplied by the manufacturer with special attachments to be used in the case of very high boiler pressures, and these, no doubt, will be useful in all cases above 180 lbs. pressure. There are a number of other devices intended to effect the same purpose, and, no doubt, they have already been brought to the attention of interested officials. The important consideration is an even and certain oil flow to the valves direct.

Electric Motors at the Tiffany Factory, Forest Hill, N. J.

In our issue of April 2 we pointed out some of the advantages of small electric motors in machine shops, with special reference to their installation at the Baldwin Locomotive Works. We said little in regard to their cleanliness in the shop, and while the question of neatness might be a minor consideration in many manufacturing establishments, yet in others, where careful work is being done, it should receive special attention. Such is the case in the Tiffany factory recently completed at Forest Hill, N. J., on the Greenwood Lake division of the Erie Railroad. The managers having given the subject of power transmission a careful study, decided to adopt small electric motors aggregating 275 H. P. located in different parts of the shops and driving nearly all the tools which are used. The total floor space is 100,500 sq. ft., and all the solid silver and silver-plated ware made by Tiffany & Co., of New York, are sent out from this factory. Through the General Electric Co. we are enabled to give a description of the works, which will doubtless be of interest to many who are watching the development of electricity for power purposes in shops and factories.

The factory proper consists of a main building facing southeast and three wings extending northwest built of brick and stone. It is 350 ft. long by 300 ft. wide and is divided into 15 fireproof compartments. The plated-ware department was originally provided with a 50-H. P. Ball & Wood engine. This was, however, replaced by a four-pole 50-H. P. 850-revolution motor when electrical transmission was adopted. The other two wings of the factory have been built during the past year and are parallel to the first, but are closed at the northwest end by the engine-room. The entire steam-engine plant is confined to one room; the power is distributed by electricity over a two-wire 250-volt direct-current system. The entire electrical apparatus was made by the General Electric Company and is of their most recent design. The boiler-room, which occupies a building by itself, contains three 100-H. P. boilers, built by Hewes & Philips, of Newark. Two of these boilers are in use, the third being held in reserve. The dampers are regulated by a damper regulator, operated by steam pressure. All the feed water is filtered through a Blessing filter.

In a room by itself near the boiler-room is a Lidgerwood 30-H. P. steam hoist, which hauls the coal cars from the Erie line along the siding running into the factory, and is also used to lift the coal from the car, and dump it into the coal bin. The coal is dropped by the bucket into a hopper leading to a gravity bin, the coal following down the inclined plane toward the coal doors in front of each furnace door.

The main engine is a 250-H. P. 490-revolution Corliss, built by Hewes & Philips. It is belted by a 28-in. belt to a countershaft running the entire width of the room, to which is also belted as an auxiliary the horizontal Ball & Wood engine of 50 H. P. To it are belted two G. E. moderate speed multipolar generators, each four-pole, 100 K. W. 750-revolution machines, delivering current at 250 volts. The frames and pole pieces are of special soft steel and the armatures are thoroughly ventilated.

The leads from the generators are carried to the switchboard beneath the floor. From the switchboard the feeder circuits rise to the ceiling of the engine-room, and carried on porcelain insulators, in lines as straight as possible, pass to the various points where they are used.

The motor equipment includes about 275 H. P. of motors, varying from 3 to 50 H. P., and divided into about 18 units. These are all of the General Electric type those below 8 H. P. being bi-polar, while those above are multi-polar. The motors operate at about the following speeds: The 3 H. P. at 1,800, 8 H. P. at 1,350, 5 H. P. at 1,700, 30 H. P. at 950, 20 H. P. at 1,050 and 50 H. P. at 550.

The moulding-room contains the melting furnaces, casting machines, sand mills and boxes. Here all of the castings are made. This room contains a four-pole, 15-H. P., 1,300-revolution motor, belted to overhead shafting operating blast blower and molding machinery. In the

stamping and rolling-room, which adjoins the above department, electricity is used to drive a series of drop presses under which the silverware is stamped into the carefully executed designs. This room also contains a large rolling mill, toggle press and a hydraulic press of 1,000 tons' capacity with its pump, all driven by a four-pole, 30-H. P., 975-revolution motor, also belted to ceiling countershafting.

In the spoon-making room the plain sheets of silver pass through the various processes and emerge in the shape of spoons of all patterns ready for the polisher's table. The heavy machinery in this room consists of two large rolling mills, four spoon mills, four filing lathes, four drop presses, one shears, one saw lathe, one reversible mill and one burr lathe. All of these are driven by a four-pole 20-H. P., 1,050-revolution motor, also set upon the floor and surrounded by a brass railing.

The work of the silversmith is carried on in a small room on the second floor, and the machines are driven by two motors both mounted on small platforms. A two-pole 3-H. P., 1,800-revolution motor and a two-pole 5-H. P., 1,700-revolution machine are also used in this department. The greater part of the work in this room is benchwork, and the machinery driven by the smaller motor includes emery wheels, burr lathes and drills.

A two-pole 5-H. P., 1,700-revolution motor mounted upon a stand and driving five mills in which silver borders for teapots, coffee pots, cups, etc., are rolled, is located in the stock-room.

Adjoining this is the spinning-room, in which are 11 spinning lathes, three turning lathes, a large and small circular saw, an emery wheel and a grindstone. All of which are driven by a four-pole 8-H. P., 1,600-revolution motor, set upon a low table and belted to ceiling shafting.

The machinery in the silversmith's shop is small and consists of two swedges, one saw and drill and one burr lathe which are run by a two-pole 3-H. P., 1,800-revolution motor, mounted upon a raised platform.

The gilding-room contains three plating dynamos and two scratch brushes which are driven by a four-pole 10-H. P., 1,350-revolution motor. From this room entrance is gained to the etching, enameling and finishing room, which contains a series of polishing wheels, scratch brushes and drills all driven by a four-pole 10-H. P., 1,350 motor.

The machinery in the machine shop consists of lathes, planers, shears, shapers, milling machines and cutters, all driven by a four-pole 10-H. P., 1,350-revolution motor mounted on a stand and belted to a ceiling countershaft. The brushing and bobbing room contains a four-pole 15-H. P., 1,200-revolution motor, also belted to the ceiling countershaft, from which two belts are brought down to shafting running beneath the brushing and bobbing benches.

At the side of the brushing and bobbing room is a small room containing a Sturtevant exhaust fan and an exhaust tank, a McKenzie blower and a large Root blower driven by a four-pole 30-H. P., 975-revolution motor. The exhaust fan draws all the dust from the brushing and bobbing tables into the tank, where it is collected for reduction in the smelting and refining room.

The brushing-room has a four-pole 10-H. P., 1,350-revolution motor for its machinery, which consists of a burnishing lathe, a grindstone, a scratch brush and Rouge lathes.

The last workroom of the factory is the repairing department, which is supplied with a two-pole 5-H. P., 1,700-revolution motor driving monitor and turning lathes, drills, saws and presses.

Resolutions on the Death of Albert Fink.

At a recent meeting of officers of roads in the Joint Traffic Association, Mr. George R. Blanchard, Commissioner of the Association, who was connected with the Erie road many years ago, and who took a prominent part in the establishment of the Trunk Line Association, of which Mr. Fink was the head, presented a minute on the subject of Mr. Fink's life, which was unanimously adopted and ordered to be recorded both by the Managers and by the Board of Control. The minute says:

Albert Fink, born at Lauterbach, Germany, Oct. 27, 1827, and who died April 3, 1897, was from June, 1877, to July, 1889, the Commissioner of the Trunk Line Association, the Chairman of the Joint Committee, the Secretary of the Presidents, and in many instances their arbitrator. Being chosen because of his prior demonstrated fitness for those duties, he brought to their performance a thorough education and a rare combination of organizing, executive and judicial faculties and ability, exercised his complex duties with eminent fairness, and with just consideration for mutual rights, and left the association voluntarily, bearing the esteem and regrets of all his associates and competitors.

In the conduct of his duties he showed rare powers of concentration, analysis and statement, a comprehensive mind, alive to the development of the railway system and the public business, and their mutual relations; the intricacy of the problems which he confronted, a thorough devotion to the task of solving the great difficulties encountered, and exceptional courage and discretion. His decisions were rarely appealed from and most often to himself. Even when he was most characterized by the public as giving the wisest and most liberal consideration to their interests. If the great duty which he had undertaken—to harmonize the extended rival interests which he served—was not accomplished, it was through no fault of his devotion or administration; and the expressions of his own regrets, when he left his duties, that he had not entirely achieved his purposes will be remembered by all as a tribute to his sincerity and should afford an incentive to continued effort to the same great ends on the part of those who now administer the same properties. . . .



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EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

The March gross earnings of the railroads show a slight gain over March of the preceding year. The *Chronicle* reports an increase of 1.6 per cent. for 126 roads and *Bradstreet's* reports a gain of 1.7 per cent. for 122. The gain is small to be sure, but it has a certain encouraging aspect. In the first place, March of 1895 showed an improvement over the preceding year, and in the second place the conditions this year have been quite unfavorable. Storms have interfered very much with the working of the railroads over wide territories, and the condition of the country roads has been very bad. The movement of wheat and other grains has fallen off considerably, and the gain in the movement of cotton was small. The losses for the month were chiefly in the heavy wheat carriers of the West and Northwest. The greatest gains were found on the Mexican Central, the Chesapeake & Ohio, the New York Central, the Missouri Pacific and the Southern, although the Mexican National, the Kansas City, Pittsburgh & Gulf and the Louisville & Nashville each showed gains of over \$100,000.

The *Springfield Republican*, commenting on our observation in regard to the division of the Supreme Court on the anti-trust decision, says:

"This clears up to the public an interesting view of the evident leanings of the several judges. The whole story seems to be that one group is disposed to give to the public the benefit of any doubts in the effort to bring the roads under closer government control; while the other group of judges is inclined to resolve the doubts in favor of the roads.

That is to say, Justices Field, Gray, Shiras and White are now loose constructionists, because they think that the law is too hard on the railroads, while a few months ago the fact that they were strict constructionists was to be explained by the same alleged feeling—that compelling an agent to own up to rate-cutting, on pain of imprisonment, was too hard on the railroad company. It is true that the facts, on a superficial view, make it easy to propound this theory, and it is true that judges may sometimes find it impossible to avoid doing what so many of the rest of us do, decide by sympathy instead of by logic; but the *Republican's* fancy compels us to assume that the judges named had, as their highest motive in deciding that Brown ought not to go to jail, a wish that the railroad companies might be protected in secret evasions of the law; and this in respect to a law—that requiring publicity of rates—which all good citizens admit to be a righteous one. It seems more rational to believe that the constitution was defended in the Brown case for the very reasons stated in the opinion—that its language was too firm, simple and direct to be overturned. And the decision of these four judges to disregard the language of Congress in the anti-trust law, in spite of its directness and simplicity, may be accounted for, very fairly, by the tremendous consequences that seem likely to result from adherence to it. It is not by any means the railroads alone that will suffer from a strict construction and enforcement of the anti-trust

law. For ourselves we feel compelled to admit that, technically, the anti-trust decision is sound, although, as has been said, it is one in which law and justice had to part company. The dissenters in this decision had a much easier task to justify their application of the rule of reasonableness than did the majority in the Brown case. A distinguished lawyer lately said to us, "Justice Peckham was logical; Justice White was right."

The prospect of the passage of the Foraker pooling bill, or any other railroad legislation at the present session of Congress, is a matter still clouded by doubt and uncertainty; the Senate committee works slowly, Mr. Chandler, the universal objector, being one of the members of it, and none of the reporters seem able to get any intelligent and definite expression of views from congressmen; but there are some people who seem to regard the mere existence of the Foraker bill as a substantial ground for encouragement, and the *New York Journal of Commerce* discusses it at considerable length, treating it as a hopeful piece of legislation, although criticising it as inadequate to the demands of the situation. Among the additions to the bill suggested are a clause authorizing the Interstate Commerce Commission to fix both maximum and minimum limits to freight rates, and one empowering the commission to establish uniform freight classification; a provision compelling through billing at low rates where the railroads make through rates only by combining the locals, and one to compel through billing over competing lines, this last being designed to cover such cases as that of the Little Rock & Memphis, reported upon by the Interstate Commerce Commission in 1889 and by the United States Court in 1894. All these alleged needs are too shadowy and too much befogged by differences of opinion among their friends, as well as among their critics, to warrant bringing them into the discussion at this time. The *Journal of Commerce* had better concentrate all its guns on the one point of getting such a modification of the anti-trust law as will make combinations among railroads legal as long as they do not impose upon commerce an unreasonable restraint. Uniform classification is a cry which even its original sponsors probably by this time admit to have but very little backing of real necessity to justify its continuance. A law compelling a long railroad to give up a part of its business to a short parallel line is needed only in a few cases, if at all, and the duty of administering such a law would be perplexing to the Interstate Commerce Commission and probably would throw upon the courts some difficult work which would produce very little useful result. In England, where compulsion in this matter has been sanctioned by law for many years, the power has, we believe, been exercised in only a very few cases, the self-interest of the railroads being generally sufficient to furnish all facilities needed by the public. The proposition to empower the Interstate Commerce Commission to limit reductions in rates can wait until we get the power to limit advances more thoroughly settled. The courts are very reluctant to approve even this—though the decisions of the commission will at best be only recommendations until they have been appealed by the commission to a court. A proposition to restrict reductions in rates will also be likely to meet much more strenuous opposition from the granger element than any of the other changes desired, and that opposition is not yet so mollified as to warrant any useless flaunting of red rags.

The Facts About Two Electric Projects.

Two weeks ago we stated quite definitely the situation on the Illinois Central Railroad with regard to the use of electricity for suburban working, the summing up of the case being that the Board of Directors has reached the conclusion that it would be expedient to use electricity as the motive power for the local suburban service between Randolph street and Sixty-third street, inclusive; that the President has been authorized to continue his inquiries in this direction with a view to negotiating for the necessary plant, but that there is no present prospect that bids will be asked for inasmuch as the whole railroad situation is in such an uncertain state as regards property rights and as regards the right to earn a living.

The distance between Randolph street and Sixty-third street is eight miles. There are 13 stations and the business done is very heavy, the heaviest suburban business, we suppose, that is done on any one railroad in the world. The object which the officers of the company expect to reach is a more frequent and more flexible service, rather than economy. It is not expected that electrical equipment would prove much more economical, if any, than the present steam service on the present basis of business; but it is ex-

pected that it would be much more economical if the business is done under electric railroad conditions. It is proposed to do away with the regular train schedule entirely, running the cars or trains so often that a passenger can always be sure of getting a train without waiting at a station.

We shall be very much interested to see the scheme as worked out by Mr. Wallace as to frequency of trains or cars, number of cars, speed from terminus to terminus, frequency of stops, etc. Without definite figures of this sort it is impossible to estimate what the relative economy would be; but for a service of the kind contemplated there will be great convenience in the use of electricity.

Another proposed electrifying of an existing steam railroad which has made considerable talk is that of the system of the Terminal Railroad Association of St. Louis. The papers have announced that the Board of Directors has under consideration the problem of changing the motive power from steam to electricity. The ingenious reporter says that "the idea is to dispense with the steam locomotives entirely and move all trains that enter the Union station, in fact all trains entering the city, by electricity." This is reported to cover not only the passenger, but the freight traffic, and, moreover, "the company hopes to be able to do all of its switching in St. Louis, East St. Louis and Madison with the same improved and powerful devices."

This has been taken up as "news" by the daily press and some of the technical papers, all over the country, without, so far as we can judge, the slightest effort to ascertain its truth, or even its probability, and the result is that the officers of the Association have been overwhelmed with letters on the subject from promoters, "financiers," inventors, etc. The fact is that the officers of the Association would be very glad to find a practical way of working their tunnel by something else than steam locomotives. The smoke and gas in the tunnel are very objectionable; but in the present state of the art they do not see their way to take up either electric or compressed air motors.

The Connecticut Decision on Trolley Servitudes.

The decision of the Connecticut Supreme Court that an electric railroad in a street is not necessarily an additional servitude, entitling the adjacent landowner to damages, is of more than passing moment. In no state have the antagonisms created by electric street railroads been more rancorous, and the economic and legal problems arising from the new motive power been more varied and complex. The swift and aggressive growth of this interest in the commonwealth has not taken place without a vast deal of friction in its encounters with the steam companies, with local property rights, actual or claimed, and with municipal hostility, roused of late by rash surrender in earlier days of franchises, while there have been many conflicts of trolley with trolley.

Under such conditions it seems somewhat strange that a judicial finding on the question of the added servitude should have been delayed so long, and it seems more singular still that up to last week there had been only two decisions of the Connecticut courts bearing on the subject, and both of those decisions very old. One was that in the case of *Inlay vs. The Union Branch Railroad Company* (26 Conn., 249), in which the Supreme Court found unanimously that a steam road was an additional servitude on a Connecticut highway. That was before there was any street railroad in the state, but the principles laid down by the Court pointed directly to the additional servitude of any railroad laid in a public street. The Court declared, for example, that the occupation of a street by a railroad company without paying damages implied its continued free occupation should the street as such be discontinued and revert to the original owners, and the Court also emphasized the principle that any passing vehicle must leave the highway unobstructed and in its natural condition as a road. The decision was rendered in 1857; yet eight years later Judge Ellsworth, a Supreme Court judge sitting in a lower tribunal, denied the additional servitude of the first horse railroad built in the state, and the case was not appealed. Until last week, therefore, there had been in the state a hiatus of 32 years in legal rulings on the subject—a fact, however, which perhaps adds weight and significance to the rulings just made, as enabling the judges to approach the subject with broader and more untrammelled views.

On the question the Court of five judges now divides very radically. The three majority judges, in an opinion written by Judge S. E. Baldwin, who also Professor of Constitutional and Corporation Law in the Yale Law School, cite at the outset the preamble of the earliest Connecticut statute on the

subject, which declares that the maintenance of highways in a "fitt posture" for passage, "according to the severall occasions that occurre," is necessary for man and beast and a profit and advantage for the people. The last quoted words, suggesting the changed uses of a highway created by new conditions, may be regarded as the keynote of the whole majority decision. In other other words, it excludes the idea of original and well-defined rights of the original proprietor, only limited by easements which allow absolutely equal rights of highway transit, and prohibit any form of private occupation. Rejecting such an idea, the majority opinion holds, on the contrary, the equality, if not the priority, of public right in the highway and the expansion of that right, under legislative sanction, to cover all cases of ordinary building and operation of a street railroad by electricity.

This majority argument is naturally of an "opportunist" nature and along the line of expediency rather than law. But its development by the three Connecticut judges, especially in citation of facts, is ingenious and plausible. It reviews the differences between an ordinary street railroad and a steam road; the uses even of steam locomotives and cars with broad tires on some of the English highways; the rule of law for European tramways; acquiescence by the people, the legislature and the courts in Connecticut for many years in the non-servitude theory; rights of investors in stock and mortgages, as being all of a nature to "outweigh any narrower definitions that may have been framed either by English or American courts, in former centuries and in the presence of different social conditions, however often these may have been repeated in later decisions." These quoted words show the whole tenor and drift of the majority finding, and make somewhat more singular its citation of but a phrase or two of the Connecticut decision of 1857, which, as a whole, any layman must interpret as favoring, and favoring strongly, the additional servitude.

But while definite and pronounced against the general servitude of the electric tracks, the majority of the Connecticut Supreme Court are explicit in their declaration conceding special and exceptional servitudes of such lines. Speed, construction, operation, may, they say, be abused and carried to the point of inconvenience or danger to the public and the adjacent landowner, and, as such, be the ground for damages. Practically, perhaps, this is the case already in Connecticut and elsewhere, but its emphatic statement by a group of judges arguing against the general servitude certainly does not deprive the principle of its force.

As vividly contrasted with the majority opinion, that of the two Connecticut judges constituting the minority is extremely interesting. The opinion is written by Judge Hamersly, of Hartford, the youngest judge in time since election on the bench, and is concurred in by Chief Justice Andrews, the oldest. It sweeps aside the opportunist argument and all questions of immediate expediency, changed conditions, public or private acquiescence and vested property as absolutely irrelevant, as also all questions whether or not, practically and mechanically, an electric railroad is a servitude great or small. The minority contention is that at common law the adjacent landowner is the proprietor of the highway, subject to a special and well defined easement of a public character and that the trolley line or other form of street railroad is in the nature of an illegal private occupancy—a form of trespass as regards private rights of much the same nature as would be a railroad run over a man's land without a charter or legislative authority, though the two judges do not use that metaphor. The minority emphasize at great length the earlier law and precedents of Connecticut bearing on the subject, cite copious authorities and naturally lay great stress on the 1857 case, as to which they imply sharply that the majority has missed the fundamental principle of law involved. The minority, of course, after such an interpretation of the principle, declare unqualifiedly in favor of a servitude, general, sweeping and applicable to any kind of a street railroad which can be laid.

Two such legal opinions widely divergent, and dividing the highest tribunal of an old New England state, where the law of the highway should have long ago passed its formative stage, is a somewhat curious anomaly, further accented by the findings of the New York courts in favor of the additional servitude, while the Massachusetts Supreme Court, in a commonwealth with institutions and legal traditions like those of Connecticut, has unanimously denied it. The Connecticut decision, however, while on its face a victory for the trolley companies, is by no means an unqualified one. A single change in the Court may reverse its majority of one, and, moreover, the majority finding, emphasizing, as it does, special servi-

tudes, leaves a large latitude of danger for the trolleys. Such matters as multiplied tracks in highways, a single track in a highway too narrow, a track too near the curb of a street, and noisy cars are a few of many of the flaws of construction or operation as to which the Connecticut electric roads must incur hereafter the risk of a single one of the three majority judges joining with the two constituting now the minority. The companies have escaped narrowly what for some years has been a threatening calamity, but are still held under close restraint, at least until the rules and precedents which establish in the commonwealth what are and what are not special servitudes shall be more precisely determined.

Ohio Coal and the Railroads.

The importance of the Ohio coal field, from the railroad point of view, lies in the fact that from 10 to 14 million tons of coal is annually distributed for transportation among seven railroad lines or systems with considerably over 2,000 miles. When the coal industry of that state is prosperous the lines which are so directly dependent upon it for traffic prosper, and when there is stagnation in, or low prices for coal, the transportation companies suffer. The industry has been depressed during the past three years, both on account of the general business stagnation and the sharp competition of the Pittsburgh coal district. The railroads interested stood the storm of 1893 and 1894 remarkably well and it was not until within the last four months that two of the largest, the Columbus, Hocking Valley & Toledo and the Wheeling & Lake Erie, were forced into insolvency. They might have escaped but for a coal strike in 1896, combined with a war among competing railroads over freight rates, and competition fiercer than ever from the Pittsburgh district in the lake trade.

The coal output of the state of Ohio for a series of years is as follows in tons:

1890	11,798,859	1893	14,828,097
1891	13,050,187	1894	11,910,219
1892	14,599,908	1895	13,500,000

This was produced in some 25 counties. The output is marketed at the mines, along the lines of the various railroads in the middle West, and at the lake ports. A very small portion enters the river trade—the Ohio and the Mississippi and territory tributary thereto. This little comes from Pomeroy County, and is not an important factor.

During the past three years, owing to the small revenues derived, the improvements at the mines have not been sufficient to keep up the standard. It was possible for a while to discontinue or curtail opening operations, and to confine mining to old openings and pillars. In consequence, while operating expenses were saved temporarily, the properties cannot now be worked to the best advantage, and before they are re-established on a thoroughly economic basis, a great deal of dead work must be executed. While these remarks apply to the majority of the properties, there are of course exceptions.

The troubles of the Ohio region have their origin to a great degree in Pittsburgh competition. In the years 1886, 1887, 1888 and 1889, a series of meetings of soft coal operators was held to agree upon differentials in miner's wages that would offset advantages of certain favored regions over the others. The Ohio fields got a differential of 11 cents. This was changed to 9 cents two years after or in 1891. This for a time equalized differences, and everything ran smoothly.

During the past three years the differential has been only spasmodically maintained. Reductions of wages in the Pittsburgh district were made from time to time, and were generally followed by a similar reduction in the Ohio rate, so as to maintain the nine-cent difference. This action was productive of strikes and added to the burden of the Ohio region. The principal causes which led to the differential, and which are now operative, may be enumerated as follows: Pittsburgh coal commands the higher price owing to its superior quality, and the Pittsburgh miners have a 1½-inch screen against a 1-inch screen in the Ohio region. The miners are not paid for the small coal which passes through the 1½-inch Pittsburgh screen. It is said that the difference between large and small coal which the two districts yield fully makes up to Pittsburgh the differential of nine cents, leaving the superior quality of the coal to offset the longer haul to Western competitive markets.

Another advantage possessed by the Pittsburgh region is the river market which it has at its doors. The situation of its operators, in respect to the competitive Ohio trade, is not unlike that of a manufacturer who has not booked orders in his own market sufficient to employ his works full time, and who, having covered his costs of operation and provided a fair profit on his sales, can afford to sell much lower in new markets to develop trade. Statistics indicate

that the lake market has been slowly slipping away from the Ohio trade during the past four years. A short table compiled from a report of R. M. Haseltine, Inspector of Mines of Ohio, showing receipts in tons at lake ports and the tonnage contributed by each of three states in 1893, 1894 and 1895, follows:

Total	West Virginia.	Ohio.	Pennsylvania.
1893, 4,221,913	272,212	1,356,714	3,591,987
1894, 5,452,029	280,712	1,368,917	3,802,405
1895, 4,623,712	280,781	2,128,365	2,212,466

This means that Pittsburgh increased its percentage of the total from 47.9 in 1893 to 65.9 in 1894, and to 61.1 in 1895. Ohio lost practically all of this. Its percentage of the total in 1893 was 46, in 1894 23.8, and in 1895 32.3 per cent.

In spite of its better coal, an important tonnage of small sizes mined free of expense, and its much more extensive markets, Pittsburgh has not got nearly as much for its coal at the mines as have the Ohio fields. The following data kindly furnished for this article by Alder & Rieley, of Philadelphia, coal statisticians, elucidates this point. The figures are the average of all the Ohio fields, and of returns of five counties, viz., Allegheny, Armstrong, Fayette, Washington and Westmorland, which furnish the bulk of the Pittsburgh coal:

	1892	1893	1894	1895
Ohio	\$0.94	\$0.92	\$0.85	\$0.80
Pittsburgh	0.84	0.80	0.74	0.72

Difference \$0.10 \$0.18 \$0.11 \$0.08

These differences explain how Pittsburgh was able to take from Ohio 16 per cent. of the Lake shipments in one year, and to hold practically all the gain.

To understand the present condition of the industry in Ohio something must be known of the history of the 1896 strike and the railroad fight in that year. In 1894 wages were reduced from 70 to 60 cents per ton over the 1½ inch screen. A strike was begun April 21 and continued until June 19. In the Massillon District a strike ran from Feb. 19 to Oct. 1, when it was settled by arbitration. Labor troubles have been more or less frequent from that date up to the present time, as a result of the mining scale. The wage in 1896 was changed twice. On Jan. 1 it was made 61 cents; in October it was 45 cents. The Massillon and Jackson districts either worked at the 61 cent's or struck to resist reduction. Early in January of this year a reduction to 54 cents was demanded by the operators. The miners struck and have only recently returned to work at the 54-cent rate. This is the rate now generally prevalent in the Ohio field. In the Pittsburgh region the rate was raised from 54 to 60 cents on Jan. 1, 1897, but since then a majority of miners have gone back to the 54-cent rate, or that paid by Ohio.

The railroad fight was even more disastrous to revenues than the Pittsburgh competition. The Baltimore & Ohio felt last fall that it was not getting sufficient tonnage and reduced freights, precipitating the rate war. The fight continued up to the first of February, when the interests agreed to a new basis of allotment, practically as follows: Hocking Valley, length of line, 336 miles, 28.19 per cent. of the total tonnage; Toledo & Ohio Central, 366 miles, 16.40 per cent.; Wheeling & Lake Erie, 246 miles, 12.70 per cent.; Columbus, Sandusky, & Hocking, 373 miles, 12 per cent.; Baltimore & Ohio (West of Ohio River), 773 miles, 10 per cent.; Walhonding Valley, 7 per cent. The Columbus, Sandusky & Hocking is to be allowed an extra 1½ per cent. if it can market that much additional coal, without violating the terms of the agreement, which amount is to be made up by the other lines in proportion to their allotments. This agreement is to continue for one year. There was some objection to it by certain of the coal companies. These were placated, and the percentages substantially as given were adopted. The railroads are now working under the agreement and are beginning to recover some ground. However, the fields have no differential and their markets are in consequence more or less at the mercy of the Pittsburgh operators. In fact, Pittsburgh by reason of its natural advantages has forced Ohio miners and corporation interests to almost the starvation point. The corporations thus far have demonstrated their inability to improve their lot by removing causes, and it is safe to assume that if the miners of both regions do not get the benefit of the first improvement in prices that may come with better times they will strike. A general railroad pooling law such as is now being agitated would probably settle the matter, by allowing the railroads of West Virginia, Pittsburgh and Ohio regions to establish adequate differentials and freights and enforce them under penalty.

Annual Reports.

Chicago, Burlington & Quincy.—The annual report of this company for the year 1896 (to Dec. 31) was issued this week. In the comparison of earnings and expenses all lines of the system are included, but in the passenger-

mile and ton-mile statistics the 179 miles of narrow gage are omitted, as they are in computing the freight and passenger earnings per mile of road. The average miles of standard gage worked in the year were 7,180. The main results of operation were:

	1896.	1895.	Inc. or Dec.
Gross earn.....	\$34,176,456	\$33,658,271	I. \$518,185
Expen. and taxes.....	22,660,472	22,495,662	I. 164,810
Net earn.....	\$11,515,985	\$11,162,609	I. \$353,376

The earnings from passengers decreased \$339,002, therefore the increase was from freight earnings (\$820,969) and mail and miscellaneous. The passenger miles were 22½ millions less than in 1895 (total for 1896, 324½ millions), but the average rate was greater, viz., 2.28c against 2.23. The ton miles increased 130,449,182 (5.4 per cent.) to a total of 2,577,655,000, but the rate was lower, viz., 0.864 c. against 0.878 in 1895.

With the increase of 5.4 per cent. in the ton-miles, there was an increase of a little less than 3 per cent in freight train-miles, suggesting one source of economy in operation. In fact the percentage of operating expenses and taxes fell slightly, viz., from 66.69 to 66.19, notwithstanding the lower freight rate and the higher taxes. The fixed charges for 1896 were \$9,439,838 against \$7,562,730 in 1895. The increases were \$1,480,000 in interest, \$179,415 in rentals and \$17,542 in charges to sinking funds. The dividends were \$3,280,111 (4 per cent.) leaving a deficit of \$813,641, against \$722,550 in 1895. In 1895, however, the deficit from operation was reduced by an extra dividend of \$490,188 from the cash surplus of the H. & St. J. on hand Dec. 31, 1894.

The expenditures for equipment during the year amounted to \$762,000, and for construction \$313,000. The largest single item in the construction expenditures was \$110,613 for land in Chicago and the next largest \$108,427 for new ballast on controlled lines.

It is proposed, at the stockholders' meeting in May, to change the fiscal year to end June 30, to comply with the custom of the commissions and most railroads.

Last week the papers day after day contained more or less circumstantial accounts of an air-ship that had been seen scudding through the heavens over Omaha and adjoining states and territories. This mysterious vessel was seen only at night, and, so far as we can ascertain, only on dark and cloudy nights. It was then discerned, huge and shadowy, sometimes dimly lighted and sometimes blazing out like a meteor, darting with the speed of lightning through the clouds, to the amazement of the open-mouthed farmers and newspaper reporters. Much ingenious speculation was expended on this mysterious apparition; but any newspaper editor who has education and judgment enough to qualify him to conduct a country weekly would have known that the chance of the least truth or importance in this yarn was about one in 10,000. But it is not the function of the modern "editor" to scrutinize the news; it is his business to amuse the gobemouche who buy his paper, and the more fantastic the stories the more amusing. The latest explanation that we have seen of the air-ship is that two or three wags sent up one dark night a small fire balloon, which probably cost them about 75 cents, and which might have risen several hundred feet in the air and have been visible for 15 or 20 miles before it was finally burnt out. Every intelligent American child is familiar with that sort of air-ship. Any man fit to be entrusted with the editorial charge of a newspaper knows that the art of navigating the air has become a matter of applied mechanics, like the art of navigating the sea, but immensely more delicate and difficult. He knows that many acute and able and highly-trained scientific men have been at work with enthusiasm and assiduity for years in trying to make this art successful, and he knows that they have got only to the point of short and precarious flights with small models, and that they long ago proved that it is physically impossible to handle a balloon with any certainty or tolerable safety. Knowing these things, he would, if he stopped to think, realize that it is to the last degree improbable that two or three unknown individuals on the banks of the Platte have secretly contrived an airship, which they successfully hide from their neighbors during the day, and with which they can make mysterious journeys in the air at night.

We note in another column the decision of the Connecticut Supreme Court that an electric railroad in a street does not necessarily constitute an additional servitude. The Wisconsin Supreme Court has also just had a case of this kind. In the case of the Milwaukee, Racine & Kenosha Electric Railway Company it holds that:

"The charter of the defendant company contemplates the construction and operation of commercial railways between Milwaukee and Kenosha, which, of course, on the same theory, might be extended to Chicago. That such commercial railway upon public streets and highways, engaged in the carriage and transportation of merchandise, personal baggage, mail and express matter, as well as passengers, would tend to obstruct and interfere with the ordinary uses of a street or highway would seem to be quite manifest. Such use of streets and highways constitute, in our judgment, an additional servitude or burden on the lands of abutting owners, for which they are entitled to compensation."

It would appear that this decision leaves untouched the case of a street railroad carrying nothing but passengers. In Connecticut, or Wisconsin, or anywhere else, a fundamental element in the question is whether the additional use of the street is for the benefit of the public, or of a private individual or corporation, or both;

and if both, in what proportions to each. With this is bound up the question of taxation of street-car companies, and as this is everywhere in a very unsettled condition, there would seem to be a prospect of litigation unlimited for a number of years to come. The public certainly wants electric cars in many roads and streets, both in city and country. If a quiet and well behaved car occupies a street which is not crowded, and pays the city or town a suitable sum for its franchise, the abutter certainly has no very great ground for a grievance. Often his property is benefited. But a noisy car is an offense, as much as any other nuisance—say a mule-driver who swears at his team when they are not to blame for getting stuck in the mud; and a street railroad corporation which, by fooling or bribing aldermen, gets a valuable franchise for nothing, and so makes too much profit out of its passengers, is abusing a public right, as clearly as though it ran cars 20 ft. wide and refused to turn out on meeting a load of hay. In cases like these we may be sure that the landowner will sooner or later succeed in getting the corporations restricted.

Specifications for Malleable Castings.*

The rapid growth of the use of malleable iron castings in car and locomotive construction has been brought about principally through constant and material reductions in their selling cost, the former great difference in cost between gray and malleable iron castings having largely disappeared. There is still an average difference of about one and one-quarter cents per pound between gray and malleable iron, but this difference quite disappears in the net costs, a malleable casting of a given pattern weighing sometimes 60 per cent. less than the corresponding gray iron castings.

Now, the danger is that advantage will be taken of sacrificing the quality of the material, of turning out carelessly molded and carelessly and insufficiently cleaned and annealed castings. One way to check the downward tendency of prices and thus save the quality is for purchasers to buy under rigid specifications.

The practice that is followed in gray iron-work in casting a test piece in the same mold with the casting proper can hardly be followed in getting malleable iron test pieces. The condition of gray iron castings is supposed to be uniform throughout in a given casting or in any number of castings from a variety of patterns representing thick and thin sections, while in malleable castings the annealing is most effective on thin sections. Therefore a solid test piece of malleable iron would hardly represent a lot of malleable castings from a variety of patterns; and a ribbed and cored test piece that would fairly represent such a lot of castings would be nearly as difficult to make. These are the principal reasons for recommending that test pieces shall be taken out of a finished casting; one or more pieces from different castings (patterns) to be taken at the option of the inspector. Of course in this we would lose the benefit of the skin at the planed edges.

A casting should be selected from a miscellaneous lot that would give a test piece with the smallest section at or near the middle of the piece; this is to insure the piece not breaking in the jaws of the machine in tensile testing and to prevent it from breaking on the supports in transverse testing. As there is but little, if any, reduction of area, the cross-section area may be left for determination after breakage. This allows of test pieces being taken out through flats, ribs, fillets and coring.

In 1891 and 1892 a committee of the Master Car Builders' Association reported the results of some tests on specimens of malleable iron castings. The finding of the committee was for a tensile strength of from 25,000 to 34,000 lbs. per square inch. Since then a considerable advance has been made and we are justified in expecting better things. The figures for tensile strength that I will recommend are not as high as one manufacturer has expressed a willingness and ability to guarantee. The specifications submitted for discussion and possible revision are as follows:

TENSILE REQUIREMENTS.

At the option of the inspector, one, two or three castings of either one or different patterns shall be selected from each 2,000 lbs. of finished product. From one or all of the castings thus selected test pieces shall be cut and prepared, one from each selected casting. The position in the casting from which the test piece shall be cut is to be determined by the inspector. The size of the test piece shall be, as nearly as possible, such as will give, when the piece is prepared, a uniform clear length of 4 in. between the grips of the testing machine, and such as will give, as nearly as possible, a cross section area of ½ sq. in. Tests of one or each of the pieces thus prepared shall show a tensile strength of not less than 40,000 lbs. and not more than 47,000 lbs. per square inch. The elongation and reduction of area measured after fracture shall be distinctly noticeable as indicating some degree of ductility, and should be at least 1.5 per cent. for each. Should the average of three tests show a tensile strength below 43,000 lbs., and coupled with this, if ductility is not plainly discernible, the inspector shall have the option of repeating the test.

TRANSVERSE REQUIREMENTS.

Besides the tensile tests, transverse tests shall be made as follows: From the same castings, or others, at the option of the inspector, one, two or three test pieces shall be prepared, giving a length of 12 in. between centers of supports and having as nearly as possible a cross-section of 1 in. square. If there should be any difference in the dimensions of the sides, the piece should be set in the machine with the greater dimension vertical.

The supports shall be 12 in. apart, center to center, and of the usual shape for making transverse tests of gray iron casting. Tests of one or each of the test pieces thus prepared shall show an ultimate transverse strength of from 3,900 to 4,800 lbs. per square inch, and deflections from 0.35 to 0.65 in. The average breaking load for any number of tests should be about 4,900 lbs. per square inch and the average deflection about 0.5 of an inch; this for specimens of the sizes recommended and for a metal of the characteristics suitable for car castings.

The fractures in both tensile and transverse tests should be fine grained and uniform; blow-holes should be absent; bright edges like the chill in chilled castings should generally show distinctly at the edges; the center should generally appear almost as dark as burnt iron. No great dependence, however, can be put upon an examination of the fracture in determining the quality of malleable castings, further than seeing that castings are of uniform fine grain and free from blow-holes, as the fracture will vary in appearance according to the size of section.

BENDING AND TORSIONAL TESTS.

Malleable castings which successfully pass the above requirements in tensile and transverse tests will generally successfully pass bending and torsional tests of equivalent

*Extracts from a paper by Mr. C. L. Sullivan, National Malleable Castings Co., read at the February meeting of the Western Railway Club.

severity. Reasonably thin sections, about ½ to ¾ in. thick, by about 1 to 3 in. wide, should bend over on themselves around a circle at the bend equal in diameter to twice the thickness of the piece and back again straight. And in torsion a thin piece of uniform dimensions, or nearly so, should twist once around without fracture. It only requires proper mixtures and proper annealing, coupled with care in other particulars, to make malleable castings that will weld on themselves; that will draw out to a knife-edge on an anvil under a hammer; that will temper and cut soft iron like a cold chisel. Such castings, however, cannot be had at the prices at which some malleable castings are quoted, and probably such qualities are not required in car castings.

NOTES AND INSTRUCTIONS TO INSPECTORS.

All tests should be made at the place of manufacture prior to the shipment of the castings. Extra castings from which to cut test pieces or test pieces cast in molds, and the preparation of test pieces, shall be made at the expense of the manufacturers.

Test pieces cast in molds are to be furnished if required. If manufacturers have no means of making tests, the expense of making tests elsewhere shall be borne equally by manufacturer and purchaser.

Purchasers should have a knowledge of the reputation for the quality of work of the several malleable foundries.

Planed and turned test pieces should be tested occasionally to determine the penetrating effect of annealing.

The effect of suddenly applied loads, corresponding to shocks, should be determined by some convenient tests.

In carload shipments the inspector is to determine whether but three test pieces shall represent the carload. If a carload is made up of such a great variety of patterns as not to be fairly represented by three test pieces, and if there is any doubt in the mind of the inspector as to the uniformity of product in the carload lot, he shall test enough pieces to fairly represent the whole lot.

It is almost impossible from the limited amount of information on the subject of malleable castings to determine upon requirements in bending and torsional tests. It is quite certain that one set of requirements will not do for general car and locomotive machine and agricultural castings. As we are dealing with railroad castings, our requirements are made to fit them only.

If patterns are furnished by manufacturers, inspectors shall insist that all abrupt changes in forms shall be relieved by fillets.

In case of duplicate patterns, castings from same shall compare closely in weight.

All castings shall compare closely with guaranteed weights when in competition with gray iron castings.

Beside making tensile and other tests, inspectors shall closely inspect all castings; rejecting all that show unmistakable defects, such as shrinkage cracks, large ridges at partings, evidence of blow holes, castings badly warped, cracked or broken castings, castings not properly cleaned, castings that are incorrect in important dimensions due to errors in patterns, castings requiring cleaning, pickling or machining not previously agreed upon.

Flood Damages.

The widespread damage done by floods in the West and South during the past few weeks is well known. Loss or damage to railroads cannot be accurately reported, except where detailed official statements can be secured, because in nearly all cases it consists chiefly in the washing away of ballast, destruction of culverts and small trestles and loss of traffic by the temporary discontinuance of trains. The floods have been mostly in regions where high water is expected every year, and losses of important metal or other truss bridges have been few. We have two definite reports. The first, from the Atchison, Topeka & Santa Fe, in Texas, says:

"In three days the line was open and trains were running through on schedule time. In one place the men had to get into water up to their waists and roll the track over and over, to get it back into position.

"In all we had 84 bents washed away, affecting 21 bridges. These washouts were between Valley Mills and Blum, and between Cleburne and Dallas. In all, 7,500 feet of track was washed off the dump and into the mud. These washouts were between Valley Mills and Clifton, Meridian and Morgan and Blum and Kopperl. The longest washout was south of Morgan, where 23 bents of bridge and track were carried away. The next longest break was the south approach to the Steel Creek iron bridge, south of Morgan. The approach was 30 ft. high, and eight bents were washed out, leaving the deck hanging. It had to be jacked up 7 ft. The next break was between Valley Mills and Clifton, where 14 bents were washed away, and the track was carried 500 ft. from the dump. These are the most serious breaks, the others being smaller trestles, which were readily repaired."

On the Chicago, Milwaukee & St. Paul, in South Dakota, the situation was peculiar. An officer of the road says that this was the first time that washouts had occurred on all the company's lines in that region at the same time; in other years it has always been possible to run trains around washouts. In the present instance the high water followed the breaking up of the ice, and, in fact, on one division there was trouble from high water while 100 miles away they were using a rotary plow to clear the tracks of snow. There was no serious calamity, and as fast as the water receded it was only a short time until trains were run through. A number of small bridges and culverts and the embankments forming the approaches to some of the larger bridges were washed out, but no metal structures have been disturbed, and, therefore, no iron bridges will be required in renewals. The highest water was along the James and Big Sioux rivers, and as these rivers cross all the divisions, passengers had to be transferred by boats at these and other points. At the present time the tracks are repaired and trains are running through, except at two points on a minor division, where, at last accounts, passengers were still being transferred.

TECHNICAL.

Manufacturing and Business.

The Worcester Construction Co., of Worcester, Mass., has received contracts to build and equip the Worcester, & Marlboro (18½ miles) and Winsted & Torrington (13½ miles) street railroads.

The Bethlehem Iron Co., through its Western Agent, H. F. J. Porter, 1433 Marquette Building, Chicago, has received a contract to furnish hollow forged steel shafting for the new power-house of the South Side Rapid Transit Co., of Chicago.

The Penn Steel Casting Co., of Chester, Pa., recently received an order for five sets of 5,000-H. P. armatures for the Niagara Power Co.

The Morgan Engineering Co., of Alliance, O., has received an order from Jones & Laughlin, of Pittsburgh, for three electric traveling cranes of 10 tons' capacity each. Two will have a span of 40 ft. and the third 80 ft.

Julian L. Yale, who recently resigned as General Sales Agent of the Illinois Steel Co., has become associated with W. H. Salisbury, of Chicago, in the rubber business.

William M. Breithaupt, C. E. bridge engineer, has removed his office from 71 Broadway to 35 Nassau street, New York City.

The Lebanon Rolling Mills Co., at Lebanon, Pa., has made an assignment for the benefit of creditors to Samuel E. Light, General Manager, and M. H. Leonard, of Philadelphia. It is stated that the assets are in excess of the liabilities and that a reorganization of the company is contemplated.

The Osborn Co., consisting of Frank C. Osborn, W. O. Henderer and Bernard L. Green, civil engineers, Cleveland, O., has removed its offices from the Hickox Building to more commodious quarters in the Osborn Building, Prospect and Huron streets.

The Grand Trunk Railroad Co. has decided to erect a new grain elevator at Midland, Ont., provided the town will grant a bonus of \$25,000, which will probably be done. The proposed elevator will cost about \$200,000.

The Damascus Bronze Co., of Pittsburgh, Pa., has been awarded a contract by the Schoen Pressed Steel Co. to furnish the journal bearings for the 600 steel cars for the Pittsburgh, Bessemer & Lake Erie Railroad. These bearings will be 5 x 9 in., and this is the first order for bearings of that size that has ever been placed. They are to be made of strictly new material, the component parts being seven parts copper to one of tin, and the aggregate amount will be between 90,000 lbs. and 100,000 lbs.

Bement, Miles & Co., of Philadelphia, Pa., have recently sold to the Haskell & Barker Car Co., of Michigan City, Ind., one hydraulic wheel press and a heavy axle lathe for turning steel axles for cars of 80,000 lbs. capacity.

Suit has been instituted at Belleville, Ill., against the Lansburg Brake Co., the plaintiffs claiming that other stockholders have conspired to sell property of the company valued at \$100,000 to the Westinghouse Air-Brake Co. for \$35,000, and to pay \$5,000 to the American Refrigerator Co., for which no consideration has been given. The appointment of a Receiver and an injunction to restrain the disposal of property of the company is asked for. The capital stock of the company is \$2,000,000.

Charles F. Pierce has been appointed Western Agent for the Sterlingworth Railway Supply Co., with office at No. 1412 Great Northern Building, Chicago. Mr. Pierce was at one time connected with the Tiffany Refrigerator Car Co., and later with Fairbanks, Morse & Co.

Cyrus Robinson, of New York City, will act as Business Manager for the Ridgway Dynamo & Engine Co., of Ridgway, Pa. The company has also opened a branch office in the Hamilton Building, Pittsburgh, in charge of William B. Brew. The Ridgway Dynamo & Engine Co. is a reorganization of the McEwen Manufacturing Co.

The expected consolidation of the South Baltimore Car Works and the Maryland Bolt & Nut Works, of Baltimore, has been formally announced.

The works of the South Sharon Steel Co., at Wheatland, Pa., two miles below Sharon, which it was expected would be in operation by April 1, will probably not open before the 1st of June. The plant is being equipped with all modern machinery for the manufacture of street car rails.

The Berlin Iron Bridge Co., of East Berlin, Conn., has received an order to furnish the steel work for the new power station of the Worcester & Marlboro Street Railroad now being erected at Northboro, Mass. The engine-room will be 55 x 63 ft. and the boiler-room 45 x 40 ft.

The Governor of California has signed a bill appropriating \$300,000 for the improvement of the Sacramento River, which amount includes an authorization for the purchase of a dredge.

The offices of the Melan Arch Construction Co and Fr. von Emperger, consulting engineer, have been removed from 71 Broadway to 35 Nassau street.

Iron and Steel.

Rebecca furnace, of the Kittanning Iron & Steel Co., Kittanning, Pa., has been blown in, after an idleness of several months.

The Cambria Iron Co. has announced that, under authority given by the shareholders at the annual meeting on Jan. 16, the company will issue \$2,000,000 of the authorized \$2,500,000 bonds, to pay off the present loans and provide funds for the ore property about to be purchased, and for additional coke ovens and other improvements to be made at Johnstown, Pa. The bonds will be offered to the shareholders at par, in the proportion of 25 per cent. of the par value of their stock.

The Reading Steel Co. has recently been organized at Reading, Pa., by Philadelphia and Pottstown business men, with a capital stock of \$20,000. The incorporators

are Clement C. Smith, E. B. Leaf, J. S. Robeson, Henry Potts and Joseph Hartshorne, of Philadelphia. They have leased the plant of the Diamond Steel Co. in North Reading, and will make high-grade steel.

The Rochester & Pittsburgh Coal & Iron Co. will build 200 new coke ovens at Reynoldsville, Pa., as soon as the 50 ovens now under way at Eleanor shall have been completed. At Prescottville also arrangements are making for the building of 500 new coke ovens.

The Carnegie Steel Co.'s right to use the Harveyizing process in hardening armor plate without paying a royalty is being disputed by the Harvey Steel Co., of Brills Station, near Newark, N. J., which has filed suit against the Carnegie Co. to restrain them from using the process.

The Braeburn Steel Co. has been incorporated with a capital of \$200,000, and William Metcalf, Philip B. Hasbrouck and Charles Metcalf as directors. The plant is being built at Braeburn, Westmoreland County, Pa., and is intended to make crucible tool steel and open-hearth steel.

New Stations and Shops.

Bids have been asked for by the Philadelphia & Reading for a new one-story iron freight house at the corner of Front and Noble streets, Philadelphia. The building will be 36 ft. wide on Noble street and 325 ft. long on Front street. It is expected that it will be used for out-ward-bound freight.

The Fitchburg Railroad proposes building a new passenger station at North avenue, Cambridge, Mass., and it is expected that bids will be called for within a few days. The building will be of Milford granite with brown stone trimmings. The main waiting-room will be about 40 x 80 ft. in size.

The Dayton Northern is building a new station to cost about \$10,000 at Lima, O.

It is stated that the Lake Shore & Michigan Southern will build a freight depot 60 x 200 ft. in size at its docks at Ashtabula, O.

The Lehigh Valley has advertised for bids for the steel work on the new depot at Rochester, N. Y., and it is expected that the contract will be let within a short time. The train-house will be 430 ft. long and will include four tracks.

Garlock Hydraulic Packing.

The cut shows the external appearance of a packing recently brought out by the Garlock Packing Co. intended to provide a superior waterproof hydraulic packing to meet the requirements for the plungers and pistons of pumps, pumping machinery, hydraulic elevators, etc. The makers claim that this packing overcomes the difficulties encountered heretofore in rawhide and other packings supplied for these purposes.

The packing has been produced after numerous practical experiments and tests on the water ends of pistons and plungers of hydraulic machinery and elevators, pumps and pumping machinery, and the results appear to justify the claim of the makers that they have produced a first-class waterproof packing, made of the best quality of selected flax and lubricated with a waterproof compound which is strictly free from acid. This packing is furnished on rod and stuffing box measurement only; they must be exact to give the desired results.

Smith's Electric Switch and Signal.

Mr. Charles G. Smith, of 123 Water street, Pittsburgh, Pa., has lately patented a railroad switchstand in which is contained an electric motor for moving the rails of the track, the motor to be started and stopped by a signalman located at a station, or at any other distant point, by means of an electric current conveyed through a wire. The switchstand has at its top a signal arm somewhat like a semaphore, together with a cylinder containing red and white electric incandescent lights to indicate the position of the switch at night. The upper part of this cylinder has a white glass and the lower a red one, the movement of the switch changing the light automatically from the red opening to the white one, and vice versa.

The electric motor imparts motion upward or downward to a vertical rod by means of a worm gear, and this rod, being connected to the switchrod at the bottom and to the electric lamp at the top, the switch is moved and the position of the signal arm and the lamp are changed, all by a single motion. There is an indicator at the office, or cabin, which assures the attendant that the switch has actually been thrown.

Leaving Trucks on English Locomotives.

A correspondent in London writes to us: "The North Western is the only one of our great express lines which does not use bogie engines for fast passenger traffic, though it is fair to say that the more modern types of North Western engines have radial axles. There is only one other company of any importance in Great Britain which still adheres to the old rigid six-wheeled pattern—the Great Eastern—a comparatively poor company which frankly avows that it grudges the extra expense

of bogies. And seeing that its trains are, though very heavy, never very fast, and its lines are in the flat districts of the East of England, where curves need seldom be sharp, no doubt it can manage to get along without them."

A Record in Fuel Economy.

We lately extracted from Mr. George W. West, Superintendent of Motive Power, New York, Ontario & Western, some figures showing a considerable reduction in cost of fuel. With an increased engine mileage of 22,657 miles, and an increased car mileage of 1,574,365 miles, the cost of fuel was reduced from \$320,609.78 in 1894 to \$256,672.76 in 1896. The road has now in use 50 engines fitted to burn culm and five more are being remodeled. Other engines will also be changed as fast as they require new boilers.

The Janney Lock.

Our illustrations represent the new locking pin and trigger for Janney freight car couplers. Fig. 1 shows the pin with the trigger in the position that it assumes



when the pin is in a locked position. The point of the trigger, shown in Fig. 4, projects beyond the face of the locking pin and bears against the lower side of the top wall of the coupler casting. Any attempt to lift the pin, except in the regular way, only binds it more tightly against the coupler, and prevents the locking pin from rising. Fig. 2 shows the pin with the trigger drawn back into the hollow head of the pin. This position is assumed when the tail of the knuckle is passing the pin in the act of coupling, or when the locking pin is lifted by the uncoupling lever to uncouple. Fig. 3 is a detail of the new locking pin, showing the cavity into which the trigger goes.

Oil Burners on the Atchison.

The newspapers have been circulating the story that the Santa Fé is changing its oil burning engines back to coal burners. We are informed that there is no truth in this story.

Uncoupling Arrangements for M. C. B. Couplers.

The Master Car Builders' Committee appointed to submit designs for uncoupling arrangement for freight cars requests answers to the following questions:

1. How many of the box, stock and refrigerator cars in your equipment are provided with projecting end sills?
2. How many are provided with concealed end sills?
3. On how many cars in your equipment is the location of the bolts securing the carrier irons the same as that shown on Plate "B" of the "Recommended Practice" of the association?
4. How many of the automatic couplers in use on your cars have the locking pin located in the center line of the coupler?
5. How many are located away from the center line, and what is the distance, and to which side, facing the coupler, when applied to the car?
6. Where projecting end sills are used, what is the vertical thickness? Where projecting end sills are not used, what is the vertical height of the coupling blocks?
7. What is the diameter of the release rod you have in use, and the length between centers of arms?
8. What is the diameter of the iron in the links and clevises you use?

Replies should be sent to the Chairman of the committee, G. L. Potter, Superintendent of Motive Power, Pennsylvania Co., Fort Wayne, Ind.

The Boston Union Station.

The contract for the erection of the new terminal station at Boston has been let to Norcross Brothers, of Worcester, the work to be completed in about two years and to cost about \$2,000,000. This contract includes the whole of the building except the train shed. The superstructure will be of granite from Stony Creek, Conn., not brick, as was at first proposed. There are two separate contracts, one for the foundation and another for the superstructure, but Norcross Brothers took both of them.

THE SCRAP HEAP.

Notes.

A committee of citizens of Frankfort, N. Y., has decided to sue the New York Central for breach of contract in removing from that village the repair shops of the West Shore road, which were established there when the road was built.

On the Pennsylvania lines west of Pittsburgh the passenger-train porters have been discharged, except on the New York and Chicago limited. A press dispatch from Bloomington, Ill., states that the Chicago & Alton has discharged 100 men from its shops there.

The legislature of Indiana recently passed a law limiting the fare on street cars in the city of Indianapolis to three cents. On April 9 the Central Trust Co., of New York, trustee of the bonds of one of the companies affected, entered suit in the United States Court at Indianapolis asking for an injunction to prevent the carrying out of the law.

On April 2 a special train of the Gulf, Colorado & Santa Fe, consisting of two cars, ran from Clifton, Tex., to Temple, 53 miles, in 65 minutes, including three stops, one of which lasted five minutes; and from McGregor to Moody, 10 miles, the time used was, according to the re-

ports, seven minutes, making the rate of speed equal to 85.7 miles an hour. The engine was an old one, with 62-in. driving wheels.

The suit of the state of Pennsylvania against the New York, Pennsylvania & Ohio to recover \$172,403 tax on shares of the company's stock has just been decided by Judge Simonton, at Harrisburg, in favor of the state; though the decision holds that the assessment should be, not upon the whole stock, but upon a proportion of it based on the proportion of the company's mileage lying in the state of Pennsylvania. The judgment as now rendered by the Court calls for a tax of about \$25,000. The defense of the company is based partly on the great difference between the actual market value of the stock, which was exceedingly small, and the assessed value. The road will appeal to the higher courts.

On Sunday, April 11, the Louisville, New Albany & Chicago road carried 291 prisoners from Michigan City to Jeffersonville by a special train, and by another special train carried 369 prisoners from Jeffersonville to Michigan City. The transfer was made in consequence of converting the Southern Penitentiary into a reformatory, and of other changes recently ordered by the legislature. Each of the special trains had "a car for the press" and the journeys were therefore written up for the local papers in great style. As it is stated, however, that the guards in the cars had no weapons except canes, the savage details of some of the reporters' statements may possibly be taken with a grain of salt. The outside guards had, however, been ordered to "shoot the first head that was poked out of a window." The road was specially examined and guarded, and the usual crossing stops were omitted, by permission of the Governor.

Many of the legislatures are still hammering away at railroad laws and other things, though in most of the states there are prospects of early adjournment. In Colorado adjournment has already taken place. One of the acts passed was the usual free bicycle law. In New York the bill to prohibit ticket brokerage has been passed by both houses, though the date on which it is to take effect is put off more than a year; that is, to September, 1898. This will give ample opportunity for the lobbyists to get it repealed next winter. In Illinois the bicycle bill is said to be doomed to defeat. In Iowa the Temple bill, a proposition providing that no clause in the contracts of insurance in railroad relief associations shall hereafter be valid which binds the employees not to sue the company for damages in case of injury, is said to have been defeated. In Michigan a committee has investigated the railroads to the best of its ability, and has reported various alleged instances of oppression in rates, but "as a whole," the report declares, "freight rates in Michigan are the cheapest in the country;" which seems to neutralize the other statements made, for the alleged oppression is said to be non-discriminative; all the citizens are oppressed in the same degree. The report also recommends the appointment of a railroad commission of three members. Michigan now has a single commissioner. In Pennsylvania there is a bill to permit street railroads in cities to carry freight. In Wisconsin the bicycle bill has gone through the house with flying colors.

The Sixth and Eighth Avenues Lines, New York.

Mr. H. K. Braker, of 95 William St., informs us that the reports are true in reference to his proposition to purchase the franchises of the Sixth and Eighth avenue lines. He offers to pay to the city a million dollars in cash for each of the franchises of the Sixth and Eighth avenue lines, which are now controlled by the Metropolitan Traction Co. In addition to the above amount he offers to pay the sum that the city will be required to pay to the owners of such roads which represents the cost of construction and 10 per cent. additional as required by the original contract of 1851. Besides this there shall be paid an annual amount equal to three per cent. of the gross earnings for the first five years and five per cent. thereafter, such sum in no year to be less than \$50,000 on each road. He also agrees to accept transfers from all connecting roads. According to the published statements of Mr. John D. Crimmins, it would be impossible to purchase the Eighth avenue line for its cost price plus 10 per cent. As to the Sixth avenue line, Mr. Crimmins is quoted as believing that the city has the right to buy, but it would be necessary for the Court to settle the question if any attempt was made for the city to enforce its claim.

The Commissioner of Public Works has granted a permit for the Metropolitan Traction Company to tear up the streets necessary to change the motive power on the Eighth avenue line, but the company will probably not begin the construction work until the question of the purchase has been definitely decided. The permit for the Sixth avenue line has not as yet been given.

An interesting phase of the question comes to light. It appears that Senator Raines will introduce a bill into the New York State Legislature giving the city authorities of New York permission to issue bonds for the payment of the Sixth and Eighth avenue lines should the city decide to purchase the roads. Section 3 of this bill is as follows:

"Upon the surrender, conveyance and transfer of said railroads to said city, said city shall forthwith sell, under the provisions of Section 93 of the Railroad law, at public auction, to the highest bidder therefor, being a railroad corporation incorporated under the laws of this state, to operate a street surface railroad in the city of New York, the right, privilege, franchise of operating said railroad for a period not exceeding 25 years, with the right upon a fair readjustment of the rental thereof for a renewal for a term or terms not exceeding in the aggregate 25 years."

Speed Recorders on Swiss Railroads.

At the end of 1895 there were in use about 700 speed recorders on the locomotives and 48 on the guards' vans of Swiss railroads; that is, out of the total number of engines, excluding those used for switching, about 92 per cent. were provided with speed recorders. Besides this there is in use apparatus communicating with clock work for recording the speed of trains as they pass stations, but the engine speed recorders work well and make a printed record; therefore the use of the station

apparatus has not been increased much in recent years, except in a few long and difficult sections to record speed coming down steep grades.

A Veteran.

A record of long service has come to our notice in the case of Mr. John McCurdy, an engineer now running one of the fast passenger engines on the Michigan Central. Mr. McCurdy is the oldest employee on the road, is 66 years of age and has been continuously in the service of the Michigan Central since April 1, 1848. We are informed by the officers that he has a remarkably clean record, having in that time never been disciplined; at one time he was severely injured in a wreck caused by a broken crank pin on the engine causing the side rod to break into the cab.

Changes in the Patent Law.

Messrs. Howson & Howson, Potter Building, New York, have issued the following circular:

"We call your attention to the fact that certain changes are made in the United States Patent laws by a recent act of Congress, the main provisions of which will go into effect Jan. 1, 1898. Particularly we call attention to the radical changes made in Section 4887 of the Revised Statutes affecting the interests of those taking out, or desiring to take out, foreign patents. The section, as revised, reads as follows (the new parts being printed in italics):

"Sec. 4887. No person otherwise entitled thereto shall be debarred from receiving a patent for his invention or discovery, nor shall any patent be declared invalid, by reason of its having been first patented or caused to be patented by the inventor or his legal representatives or assigns in a foreign country, unless the application for said foreign patent was filed more than seven months prior to the filing of the application in this country, in which case no patent shall be granted in this country."

"It will be seen that the long-standing requirement that 'every patent granted for an invention which has been previously patented in a foreign country shall be so limited as to expire at the same time with the foreign patent,' is to be abolished, so that under the new law inventors can apply for their foreign patents without waiting for the allowance or arranging for the issuance of their corresponding United States patents. On the other hand, there has been added a limitation, whose effect is to cause a foreign patentee to forfeit his right to a United States patent unless he files his American application within seven months after the filing of his application for foreign patent for the same invention.

"As the amended section of the law will not go into effect until Jan. 1, 1898, and will not apply to any patent granted prior to said date, nor to any application filed prior to said date, nor to any patent granted on such application, those having foreign patents for inventions not patented yet in the United States of America still have opportunity, until the first of the coming year, to protect such inventions in the United States under the old provisions of the law."

Pneumatic Mail Tubes in New York.

The Tubular Despatch Co., a company recently organized under an old charter, has made a contract with the Post Office Department to lay 8-inch tubes and transmit mail matter by pneumatic pressure from the General Post Office, New York City, to Station P at the Produce Exchange, and to Station H near the Grand Central Station, Forty-third street. It is said that these lines are to be begun at once and are to be ready for operation on Oct. 1, but we cannot learn that the city authorities have as yet considered the question of granting the necessary permission to use the streets. The first circuit, as planned, will be a double line of tubes from the General Post Office through Mail street, Park place, Church street, Trinity place, Greenwich street and Whitehall street, to Station P, in the Produce Exchange. The second circuit also will be a double line of pipes from the General Post Office through Park row and the Bowery and Third avenue to Forty-third street and Station A, at the Grand Central Palace, with intermediate stations at Station B, in Grand street; Station D, at Eighth street, and Station F, at Twentieth street. The President of the Tubular Despatch Co. is Mr. John E. Milholland. It is proposed to convey parcels as well as mail matter, and the company has plans for laying tubes over many other routes in various parts of the city. For the two lines to be laid this summer, power will be furnished by the engines now in service at the General Post Office. As heretofore noted in these columns, a pneumatic tube 6 in. in diameter has been in use in Philadelphia, between the main Post Office and a branch office, about one mile, for four years.

New Steel Building for Japan.

Matsui & Co., of Tokio, Japan, have placed a contract with the Carnegie Steel Co., of Pittsburgh, for a fire-proof steel building. It will be 150 x 235 ft., four stories high and be used for offices and mercantile purposes. About 1,500 tons of steel will be required, and it will be shipped by way of New York, the first shipment to leave here Sept. 1, and the balance of the consignment within two months after. No workmen will be sent to Japan, as the material will all be prepared here ready for erection.

Elevation of the St. Charles Air Line.

The elevation of the tracks of the St. Charles Air Line in Chicago seems to be at last assured, all of the roads interested, except the Chicago & Western Indiana, having formally accepted the last action taken by the city government. The terms of the ordinance are that the Illinois Central, the Michigan Central, the Atchison, Topeka & Santa Fe, the Chicago & Western Indiana, the Chicago & South Side ("Alley I") and all the roads interested in the Air Line, and the grade crossings at all the streets and avenues between the lake and Stewart avenue in Sixteenth street, and the streets adjacent thereto, shall accept its provisions and proceed to either elevate or depress. The Air Line is to elevate. This necessitates the further elevation of the "Alley I" so that its tracks shall be 17 ft. above those of the Air Line after they are elevated. To accomplish this the Alley will have to elevate all of its tracks for a distance of 3,600 ft., or 1,800 ft. on both sides of Sixteenth street. The cost of the work for the Alley will be \$35,000. In consideration of the road making this elevation and in the manner provided by the ordinance, the Council gives it the 166 ft. of right of way in Harrison street needed to connect with the Union loop.

The Latest London Underground Railroad.

Within the last four weeks, a matter of considerable moment has come up for discussion before a committee of the House of Commons in the shape of a bill which provides for building an underground railroad, six miles long, from Cannon street to Hammersmith Broadway, London. The proposed road is known as the City & West End Railway, and is to be worked by electricity. Sir Benjamin Baker, the engineer of the proposed road,

and one of the engineers of the Central London line, gave the principal engineering evidence. From this it appears that there will be 14 stations on the line, the shortest distance between any two of which is 1,572 ft., and the greatest distance twice that. Just past each station the road will dip about 1 in 30. This is for the purpose of enabling a train to get up to speed quickly, and to travel over the whole line at a speed of about 14 miles an hour, including stops. It is proposed to run trains on a 2½-minute service, each train having a capacity to carry 400 people. The capital proposed is \$15,750,000, with borrowing powers of \$5,250,000. The depth of the line varies from 50 ft. to 102 ft. It is present proposed road should not be confused with the Central London Railway, which was described in our issues of Nov. 20 and Dec. 4, 1896.

Erie Canal Improvements.

The Donnelly Contracting Co., which has the contract for improving the section of the Erie Canal from station 83 x 10, near Ferry street, Buffalo, to Commercial Slip, Buffalo, has asked for an extension of two weeks beyond the time set for the opening of the canal in order that it may finish its work. The work on the canal is in good condition, and the canal can be opened on time without trouble except on this division. Mr. Adams has said that the crumbling walls on the Buffalo division are of serious moment. Cribs will be built where there is danger, and next fall the walls will have to be rebuilt. It is estimated that on the Buffalo division it will cost between \$20,000 and \$50,000 to put the banks in a safe condition to allow dredging to proceed as soon as navigation opens.

New Railroad Y. M. C. A. Building.

The Railway Men's Christian Association, composed of the employees of the Michigan Central, some time ago purchased ground for the erection of a building directly opposite the Michigan Central car shops at West Detroit, Mich. Sufficient money has now been raised by subscription among officers and men for the building, the plans have been made and the construction will be commenced in the near future. The Secretary of the Y. M. C. A. at West Detroit is paid a salary by the railroad company.

The Transandine Railroad.

The Bureau of the American Republics is informed that there is every probability that at the meeting of the Chilean Congress in June next terms will be made with the American house of Grace & Co., whereby work will be resumed in the construction of the Chilean section of the Transandine Railroad. There remains but a few miles of the road to be built, but the work involves heavy tunneling in the summit region of the Andes. When completed, there will be an all-rail connection between the City of Buenos Ayres, on the Atlantic, and Valparaiso, on the Pacific Ocean, shortening the journey between the two cities as at present, by sea and the Straits of Magellan, from 12 days to less than 2½ days.

The President and the Passenger Department.

The Detroit & Mackinac Railway, from Bay City northward near the Lake Huron coast toward Mackinac passes some of the best fishing and hunting territory in the country. The first rich harvest of pine has been taken from the northern region, and the energetic President of the road has a fair field for his genius in developing business. The following are some extracts from his passenger department "folder":

"No streams in the East compare with ours for ease, comfort and pleasure in fly fishing.

"Mosquitoes and black flies can be found before July 1 by those who look for them along our streams. They are mostly gone later. The following will make six 2-oz. bottles of the best mosquito wash (we have no poisonous snakes, and so no snake medicine is needed): one half pint olive oil, 1 oz. oil of pennyroyal, 1 oz. oil of creosote, 1 oz. camphor, dissolved in alcohol.

"For the pike in the lakes use a large hook on gimp, and after you are tired of having the pike cut your gimp, substitute for it a piece of small copper wire, then if you hook a 25-lb. or 30-lb. fish, you are less liable to lose him.

"For deer shooting use a 45-90, 45-70 or 50-95. You can kill deer with a smaller gun, but the above are bone smashers, and save time and the loss of many wounded deer.

"If you see a bear or a wolf, cut loose at him. He is not protected by law, and even if he is at long shooting distance, is in more danger than you are, if you have a good gun. Do not wear fur caps in hunting deer, and never shoot at anything unless absolutely sure what it is.

"We have the best soil and climate in the state for plums, apples, cherries, pears and other small fruits, except peaches. Our wheat, barley and potatoes cannot be beaten. We have less snow and less cold weather in winter than the country farther from the lake. Our spring is late enough to avoid much danger from frost, but when things begin to grow they grow."

A Railroad Field in Greece.

Mr. N. D. Sourmely, writing to the *Street Railway Journal* from Athens in regard to the present condition of the electric and steam railroads in Greece, says: "There is a good field for American contractors, locomotive and rolling-stock builders and others to transact much business in Greece. At present, the following lines are in the market: The municipality of Patras, a town of nearly 500,000 inhabitants, wants to build a tramway of a total length of about 18 miles, horse, steam or electric traction. Another line proposed is that from Athens to Vouliagmeni, a distance of about 14 miles. Another line is from Kalamata to the seaside, a length of about four miles, all good-paying little contracts. The government lends valuable help to such work by granting exceptional concessions, such as freedom from all import and all other dues, and every other possible facility. There is one important consideration to be held in view for such works out here; labor is abundant and extremely cheap; for example, the usual railroad diggers and workmen are paid on an average 50 to 60 cents per working day of 11 hours; engine drivers, 70 cents to \$1; engineers, draftsmen, etc., a little over \$1. The internal cost of transportation is cheap, and in fact we have so many facilities that it is really a pleasure to undertake such contracts in Greece. The Piraeus-Athens Railway (length 10 kilometers) is justly considered the best-paying line in Greece. The locomotives in use are of English and Belgian make. The Chief Engineer is an Englishman, Mr. Simmonds, a clever railroad engineer, who served for many years in the famous Cornwall Works of Tangyes, Ltd., Birmingham, and for other eminent British builders. Other important roads are the Piraeus-Athens Peloponnesus Railway, the Thessalian Railway, the Attica Railway, the North-eastern Railway and the Pyrgos-Katakolos Railway. With the exception of the Athens-Piraeus Railway, which uses English locomotives on rolling stock, all the railroad companies employ locomotives of French, German or Belgian make."

Lower Second-Class Fares in England.

The London & North Western have decided to modify their second-class fares. The directors have had the question under consideration for some time, and they have doubtless been influenced in taking this step by the success which has followed the reductions by other companies. It is not so very long ago that the chairmen of almost every railway were lamenting the decline of second-class passengers and receipts, and were discussing the advisability of abolishing the class. The heads of the companies have now a different tale to tell. The lower fares have in fact completely stopped the decline, and in many instances increases have taken the place of decreases. The directors by modifying the charges hope to attract to the second class many of those who now ride in the lower class.—*Transport.*

LOCOMOTIVE BUILDING.

The Brooks Locomotive Works last week shipped to the Jefferson & Clearfield Coal and Iron Co. a four-wheel saddle tank engine with 8 x 12-in. cylinders to be used at the coke ovens of that company. The cab is of steel, and the total weight of the engine is 23,000 lbs.

CAR BUILDING.

The Texas & Pacific has finished building at its shops the fifth chair car. It is 60 ft. long, vestibuled and lighted with Pintsch gas.

It is stated that the Florence & Cripple Creek Railroad has placed an order with the St. Charles Car Co., for 9 passenger cars.

It is stated that the Ohio Falls Car Manufacturing Co., of Jeffersonville, Ind., is building one caboose car for the Zanesville & Ohio River Railroad and 25 flat cars and one passenger car for the Gulf & Ship Island road.

The Lake Shore & Michigan Southern has recently changed its standard passenger coach color from yellow to the Wagner standard. The striping and style of letters are also changed and the whole appearance is greatly improved. This company is now building in its shops at Cleveland five new baggage cars.

The Metropolitan West Side Elevated Railroad of Chicago has placed an order with the Pullman Palace Car Co. for 25 new trailer cars.

BRIDGE BUILDING.

Allentown, Pa.—The County Commissioners have opened bids for two new iron bridges over Jordan Creek in Lowhill Township. Their respective lengths are 172 and 72 ft. There were nine bidders. The bids ran from \$576 to \$1,871 for the small bridge, and from \$1,500 to \$2,756 for the large one. The proposals were made on the plans of the bidders.

Atlanta, Ga.—The Bridge Committee of the City Council in considering the offer made by the Southern and Central roads to furnish \$25,000 to be applied to the erection of a Mitchell street viaduct has asked that the Southern and Central companies submit with their proposition a complete plan of the proposed bridge in sufficient detail to show the dimensions of all the parts with an estimate of the cost of the same.

Brooklyn, N. Y.—The Joint Bridge Committee of the Board of Aldermen of the City of Brooklyn and the Board of Supervisors of the County of Queens will receive bids until April 22 for a steel bascule bridge, operating machinery and power plant, piers, retaining walls, etc., between Manhattan avenue, Brooklyn, and Vernon avenue, Long Island City, over Newtown Creek.

The same committee also asks for bids on or before the same date for the construction of a temporary bridge over Newtown Creek, near the site of the Vernon avenue bridge, between Brooklyn and Long Island City. For details of proposals, specifications, contract and drawings, apply to the Secretary of the Joint Bridges Committee, William J. Wassmuth, 340 Fulton street, Brooklyn.

The Joint Committee has also recently adopted a resolution providing for a new \$100,000 bridge over Newtown Creek at Greenpoint avenue. The resolution authorizes the employment of an engineer to prepare plans and to advertise for bids.

Ephrata, Pa.—A petition for an extension of the bridge on Church street has been referred to a committee by the Council.

Fulton, Ky.—A storm has carried away many bridges in this county.

Huttonville, Ont.—The bridge over Credit River at this place, which was carried away recently by a flood, will be rebuilt this spring.

London, Ont.—The London Street Railway Co. will build an iron bridge south of the Kensington structure.

Los Angeles, Cal.—The Southern California will put in nine steel bridges in this section of the state during the coming year. The total estimated cost of the bridges is \$90,000. They will be built at Cajon, Morgan Station, Lytle Creek, Orange, Olive, Colton, Arlington, Casa Blanca and Riverside.

New Haven, Conn.—A resolution instructing the Board of Public Works to prepare plans and secure bids for a new draw bridge across Mill River, at Chapel street, has been passed by the Committee on Railroads and Bridges. The committee has also recommended the building of a new bridge at Willow street, at a cost of \$10,000.

New York.—The bill providing for a bridge over the Bronx River between the Williamsbridge and Woodlawn stations of the New York & Harlem has been passed.

Niagara Falls, N. Y.—The Board of Public Works has adopted the plans submitted by the Erie and approved by the City Engineer for the overhead bridges at Walnut and Ferry avenues, and the City Engineer has been instructed to advertise for bids for the construction.

Northampton, Mass.—The Mayor and Aldermen have petitioned the County Commissioners to revise the location of South street where it crosses the New York, New Haven & Hartford Railroad, and a hearing is appointed for May 11. The proposed change will involve a bridge across Mill River.

Portland, Me.—At a recent hearing before the Railroad Commissioners on the matter of the petition of the Portland & Rochester for sanction to change its tracks under the Washington street bridge over the Marginal Way, plans and specifications for two bridges were ex-

hibited. A bridge similar to the present inexpensive one, only somewhat longer, will answer all requirements of the railroad, but because in the near future two electric lines will probably pass over the bridge, it has been suggested that all the parties interested share with the city the cost of a substantial structure over the Marginal Way.

Reading, Pa.—The Court has approved the petition for a new bridge over the west branch of the Perkiomen Creek between Schulzeville and Bally in Washington Township, the old one being declared unsafe, and for a new bridge in Pike Township, crossing Pine Creek, the county to pay the costs. The Court's decree contains the condition that all work to be done shall be under written contracts, to be awarded by the County Commissioners, which contracts are to be prepared under the supervision of the County Solicitor and a competent engineer.

Spruce Creek, Pa.—The Pennsylvania intends to replace the old iron bridge on the middle division spanning the Juniata River west of Spruce Creek Station with a six-span three-track arch structure. This bridge will be about 240 ft. long and 45 ft. high.

Toledo, O.—Plans have been prepared by the Lake Shore & Michigan Southern for a four-track swing bridge across Swan Creek on its main line.

Toronto, Ont.—Sealed tenders are invited by J. McDougall, County Engineer, for a steel bridge on Yonge street, over the West Branch of the River Don at York Mills. Plans and information can be obtained at the County Engineer's office, Court-House.

Utica, Mo.—It is proposed to build a 180-ft. iron or steel bridge over the Grand River at this point, at a cost of about \$4,000. John F. Hicks, Collector, can furnish information.

Vermillion, S. Dak.—As far as can be learned about 30 bridges have been swept away by the high water in Clay County. The loss is estimated to be \$15,000. All bridges that are necessary for traffic will be rebuilt this spring.

Woodstock, Ont.—Tenders are invited for the erection of a steel bridge of 130-ft. span over the River Nith, near Drumbo, from specifications to be obtained from Davis & Van Buskirk, civil engineers, this city. Tenders are to be addressed to Mr. M. F. Ainsly, Drumbo, Ont.

MEETINGS AND ANNOUNCEMENTS.**Dividends.**

Dividends on the capital stocks of railroad companies have been declared as follows:

Central of New Jersey, quarterly, 1 per cent., payable May 1.

Cincinnati, Sandusky & Cleveland, semi-annual, 3 per cent. on preferred stock, payable May 1.

Detroit, Mackinac & Marquette, 1 per cent., payable April 15.

New England Street (New Haven, Conn.), quarterly, 1 per cent., payable April 15.

Pittsburgh Consolidated Traction, 3 per cent. on preferred stock, payable March 4.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Central Railroad of New Jersey, annual, Jersey City, N. J., May 1.

Delaware & Hudson Canal Co., annual, 21 Cortlandt street, New York, May 11.

Elmira & Lake Ontario, 20 Whitehall street, New York, May 6.

Lake Shore & Michigan Southern, special, Cleveland, O., and Erie, Pa., May 20.

Louisiana & Missouri, annual, 216 N. Broadway, St. Louis, Mo., May 6.

Michigan Central, annual, Detroit, Mich., May 6.

New York Central & Hudson River, annual, Albany, N. Y., April 20.

Philadelphia & Reading, annual, Twelfth and Market streets, Philadelphia, May 3.

Union Pacific, annual, Boston, Mass., April 28.

West Shore, annual, Albany, N. Y., April 21.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *National Convention of Railroad Commissioners* will be held at St. Louis, Mo., on May 11, 1897.

The *Association of American Railway Accounting Officers* will hold a convention at Richmond, Va., on May 26, 1897.

The *Association of Railroad Claim Agents* will hold their next meeting at the Southern Hotel, St. Louis, May 26, 1897.

The *Association of Railway Claim Agents* will hold its convention at St. Louis, Mo., during the last week of May, 1897.

The *Master Car Builders' Association* will hold its annual convention at Old Point Comfort, Va., beginning June 8, 1897.

The *National Association of Local Freight Agents' Associations* will hold a convention at Washington, D. C., on June 8, 1897.

The *American Railway Master Mechanics' Association* will hold its annual convention at Old Point Comfort, Va., beginning June 15, 1897.

The *National Association of Car Service Managers* will hold a convention at Boston, Mass., on June 16, 1897.

The *Association of Railway Telegraph Superintendents* will hold a convention at Niagara Falls, N. Y., on June 16, 1897.

The *Train Despatchers' Association of America* will hold a convention at Detroit, Mich., on June 23, 1897.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds in formal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at 1 p. m.

The *Boston Society of Civil Engineers* meets at 715 Tremont Temple, Boston, on the third Wednesday in each month, at 7:30 p. m.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 2 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Civil Engineers' Society of St. Paul* meets on

the first Monday of each month, except June, July, August and September.

The *Denver Society of Civil Engineers* meets at 3 Jacobson Block, Denver, Col., on the second Tuesday of each month except during July and August.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The *Engineers' and Architects' Association of Southern California* meets each third Wednesday of the month in the Hall of the Chamber of Commerce, Los Angeles, Cal.

The *Engineers and Architects' Club of Louisville* meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday each month at 8 p. m.

The *Engineers' Club of Cincinnati* meets at the rooms of the Literary Club, No. 25 East Eighth street, Cincinnati, O., on the third Thursday in each month, at 7:30 p. m. Address P. O. Box 333.

The *Engineers' Club of Columbus, O.*, meets at 12½ North High street, on the first and third Saturdays from September to June.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m., except during July and August.

The *Engineers' Club of St. Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineers' Society of Western New York* holds regular meetings the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.

The *Engineers' Society of Western Pennsylvania* meets at 410 Penn avenue, Pittsburgh, Pa., on the third Tuesday in each month, at 7:30 p. m.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7:30 p. m.

The *New England Railroad Club* meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Tuesday of each month.

The *New York Railroad Club* meets at 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The *North-West Railway Club* meets on the first Tuesday after the second Monday in each month, at 8 p. m., the place of meeting alternating between the West Hotel, Minneapolis, and the Ryan Hotel, St. Paul.

The *Northwestern Track and Bridge Association* meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2:30 p. m.

The *Railway Signalling Club* will meet on the second Tuesday of the months of January, March, May, September and November, in Chicago.

The *St. Louis Railway Club* holds its regular meeting on the second Friday of each month, at 3 p. m.

The *Southern and Southwestern Railway Club* meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Western Foundrymen's Association* meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. A. Sorge, Jr., 1533 Marquette Building, Chicago, is secretary.

The *Western Railway Club* meets in Chicago on the third Tuesday of each month, at 2 p. m.

The *Western Society of Engineers* meets in its rooms on the first Wednesday of each month, at 8 p. m., to hear reports, and for the reading and discussion of papers. The headquarters of the Society are at 1736-1739 Monadnock Block, Chicago.

Freight Claim Association.

This Association will meet at Nashville, Tenn., May 5. The President of the Association is Mr. George C. Arnold, of the St. Louis Southwestern Railway, St. Louis, Mo.

Western Foundrymen's Association.

The next regular meeting of the Western Foundrymen's Association will be held at 7:30 p. m. Wednesday, April 21, at the Great Northern Hotel, Chicago. This meeting will be devoted wholly to the discussion of the proposed amendments to the by-laws, and no papers will be presented.

Northwest Railway Club.

The regular meeting of the Northwest Railway Club was held April 13, at the Ryan Hotel, St. Paul. Prof. J. H. Gill, of the University of Minnesota, presented a paper entitled "The History of Blacksmithing and Methods of Instruction in Forge Work at the University of Minnesota"; Mr. Horace Pentecost, Foreman Blacksmith of the Northern Pacific Railway, read a paper on "Tool Steel and Tool Dressing." The papers on "Railroads" and "Steel Forgings" presented at the previous meeting were discussed.

Western Railway Club.

The next meeting of the Western Railway Club will be held at the Auditorium Hotel, Chicago, on Tuesday, April 20. The papers presented at the last meeting, entitled "Car and Locomotive Lubrication" and "Specifications for Malleable Iron Castings," will be discussed, together with the proposed changes in the "Interchange Rules." An amendment to the constitution and by-laws will be proposed at this meeting to enable the club to accept and care for the David L. Barnes Library. Mr. Wm. Forsyth, Mechanical Engineer C. & O. R. R., will present a paper on "The Cost of Locomotive Repairs and the Efficiency of Machine Tools in Railroad Shops." The committee appointed sometime ago will report on the subject of "The Apprentice Boy."

Central Railway Club.

At the April meeting of this club there was a special report on "Piece Work in Car Repairs" by a committee of which Mr. H. C. McCarty was chairman. It was not discussed. A paper on electricity was presented by Mr. F. B. Griffith. A discussion was held on "Apprentice Boys in Machine Shops." The subjects for the meeting of May 14 are:

Reports—Revision of the rules of Interchange Committee—H. F. Ball, Chairman; R. S. Miller, E. D. Bronner, J. R. Petrie, Allan Vail, and "Steel Shapes for Trucks: Best Method Rolled or Pressed." Committee—H. H. Hewitt, James B. Brady, Charles T. Shoen, John W. Cloud.

Discussion—Revision of the rules of Interchange, "Piece Work in Car Repairs." Committee—H. C. McCarty, Thomas Anderson, John S. Lentz, J. R. Petrie, Robert Gunn. Amendments to the constitution and by-laws proposed by Robert Potts and H. C. McCarty. Also topical questions proposed by members.

A special meeting of the club has been called for Friday, April 23, at the Hotel Iroquois, Buffalo, at 2 p. m., for the purpose of considering the report of the special committee on the revision of the rules of interchange.

Civil Engineers' Society of St. Paul.

At the last regular meeting of the club at St. Paul, Minn., April 5, Mr. Munster, at whose instance some experiments on the shearing value of wire nails in pine planks have been made at the State University, introduced Mr. Walker and Mr. Cross, the students who are making the tests. They displayed samples and gave some general results of about 200 tests of the various sizes of nails, in white and Norway pine. A white pine joint held by one sixpenny nail begins to yield at about 70 lbs. of shear, and gives way at about 160. Held by a 60-penny nail the corresponding figures are 370 and 820, the maximum figure in all cases being about twice that which indicates the point of yielding. Roughly the strength of the joint is the cube of the diameter of the nail into 50,000. The largest nails can be driven 1½ in. center to center, and nearly the full value of the nail is effective. For instance, the re-ult for one 50-penny nail to the joint was 347 and 800, while the average of nine 50-penny nails to the joint was 294 and 790. These experiments will be extended and the results tabulated and digested, and will be discussed at a future meeting of the society. President Hilgard read a few notes on the generally overlooked centrifugal and wind forces which a pile bridge has to resist and laid out considerable matter for discussion at the next meeting.

Association of Railroad Air-Brake Men.

The fourth annual convention of the Association of Railroad Air-Brake men was held in Nashville, Tenn., on April 13, 14 and 15. The programme for the meeting was as follows: "Air Pumps, Their Troubles and Treatment, and Tools for Making Repairs." Committee: Otto Best, Alex. B. Brown, H. F. Bickel, G. S. Hale, John Hume, Jr., C. P. Cronin, Fred Hain. "Proper Piping for Locomotives, Tenders and Cars." Committee: R. H. Blackall, W. F. Brodnax, J. R. Alexander, George Gregory, B. F. Hudson, Robert F. McKenna, L. E. Hopkins. "Round-House Tests of Air-Brake Equipment on Locomotives and Tenders." Committee: R. C. Cory, Isaac McKee, Robert Burgess, A. J. Gosselin, L. S. Hawkes, Robert Wark, C. B. Conger. "Best Location for the Air Gage Where It Can Be Seen by Night and Day." Committee: C. P. Cass, W. P. Steele, W. S. Heckman, E. G. Desoe, C. F. Schraag, T. J. Mendenhall, George Holmes. "Shop Tests and Repairs for Triple Valves." Committee: William Multhaner, F. M. Tiffany, W. A. Spencer, W. A. Garaghty, F. B. Farmer, C. A. Sanders, Eric Kronberg. "The Retaining Valve and its Uses." Committee: W. I. Steele, F. R. Spalt, H. C. Frazer, C. L. Johnson, M. E. McKee, Geo. W. Fairchild, J. K. Lencke. "Foundation Brake for Locomotive Tenders." Committee: W. H. Durant, W. F. Brodnax, F. M. Nellis, C. C. Farmer, John Roney, T. Warren Dow, Eugene McAuliffe.

The Engineers' Club of Philadelphia.

A business meeting of the club will be held on Saturday, April 17. The paper of the evening will be on "The Installation of the Niagara Falls Power Company," by Mr. Charles F. Scott.

At the meeting of April 3, Mr. Charles Jacobsen presented a paper on "Experiments for Determining the Velocity of the Flow of Water," in which he described the methods and results of experiments made under the direction of the Bureau of Surveys, City of Philadelphia.

Mr. Edwin F. Smith presented a discussion of a paper on the "Construction of the Queen Lane Reservoir, Philadelphia," presented by Mr. John C. Trautwine, Jr., at the meeting of March 20.

Mr. John Birkinbine presented data to summarize some features of the enormous drainage area of the Mississippi River. A total of 28 states and three territories contribute to its flow, the area of its watershed being 1,250,000 square miles, which is 42 per cent. of the total area of the United States, exclusive of Alaska. The maximum flow of the river has been computed to be 1,800,000 cu. ft. per second, and this may possibly be exceeded in the present emergency along its course. When the varied climatic conditions of its great drainage-area are taken into consideration, and the possibility of the nearly simultaneous melting of snows on the Alleghenies and Rocky Mountains, in the swamps of Northern Minnesota and upon the great stretch of prairie land, coupled with the heavy downpours which prevail in the lower regimen of the river in the springtime, one need not be surprised at the tremendous body of water that such a combination of circumstances forces through the narrow outlet of this stream into the Gulf of Mexico.

St. Louis Railway Club.

The annual meeting of the club was held in the parlors of the Southern Hotel, St. Louis, Mo., April 9, with 125 members and a number of visitors present. An interesting paper entitled "Air-Brakes and Why it is Important to Maintain Them" was read by G. W. Rhodes, S. M. P., Chicago, Burlington & Quincy Railroad. The paper presented by Mr. Rhodes was extremely interesting. Charts were used to illustrate the main points brought out by the paper, and some considerable discussion of the paper is anticipated at the next meeting. Mr. Rhodes was elected an honorary member of the club. The reports of the Treasurer and Secretary were read, and the former showed a balance in the treasury of \$720.88, with all bills paid. This is considered a very excellent showing in view of the fact that the St. Louis Railway Club started one year since without one dollar, and during the year has expended over \$2,300. The Secretary's report showed a membership of 738, and that there is now in force in the Proceedings advertising to the amount of \$2,485, which, when it is taken into consideration that the first issue of the Proceedings did not appear until June of last year, is considered a fair showing. A unanimous vote of thanks was extended to both the Treasurer and Secretary for the very satisfactory work done during the past year. The election of officers resulted as follows: President, W. G. Besler, Supt. C. B. & Q., Beardstown, Ill.; First Vice-President, Charles B. Adams, Supt. Car Service, Wabash, St. Louis; Second Vice-President, J. J. Baulch, Gen. Frt. Agt., Wiggins Ferry Co., St. Louis, Mo.; Third Vice-President, H. C. Barnard, Supt. B. & O. S. W., Washington, Ind.; Secretary, H. H. Roberts, Manager St. Louis Office of the Iron Age, St. Louis; Treasurer, S. G. Scarritt, Vice President Scarritt Furniture Co., St. Louis.

The Executive Committee was chosen by the election of J. B. Johnson, Prof. Civil Engineering, Washington University, St. Louis; J. W. Stokes, M. M., Illinois Central, East St. Louis; A. G. Steinbrenner, M. C. B., A. R. T. Co., St. Louis; W. A. Garrett, Div. Supt., Wabash, Decatur, Ill.; George B. Leighton, Prest., Los Angeles Terminal, St. Louis; F. A. Johann, Sales Agt., Shickles, Harrison & Howard Iron Co., St. Louis; and E. S. Marshall, Prest., Western Railway Equipment Co., St. Louis.

An address from the retiring President, Mr. Frank Rearden, Supt. Loc. and Car Dept. of the Missouri Pacific, was read, in which he thanked the members for the many courtesies shown him during the year, and stated that it would be impossible for him to serve in that capacity another year, and in view of the position taken by Mr. Rearden, a successor was elected, although Mr. Rearden would have been unanimously re-elected had he not declined to serve.

PERSONAL.

—Mr. H. W. Downey has been appointed General Agent of the Chicago Great Western, with headquarters at Dallas, Tex.

—Mr. E. F. Fuller, Division Freight Agent of the Pennsylvania Company, with headquarters at Cincinnati, has resigned.

—Colonel John Magee has been elected President of the Fall Brook Railroad, to succeed his father, the late General George J. Magee.

—Mr. T. L. Bingham has been appointed Commercial Agent of the Illinois Central at Memphis, Tenn., to succeed Mr. John Dwyer, promoted.

—Mr. C. M. Foulks, General Claim Agent of the Atchison, Topeka & Santa Fe, with headquarters at Topeka, Kan., has resigned on account of ill health.

—Mr. G. A. Nettleton, Chief Engineer of the Ann Arbor, with headquarters at Toledo, O., has resigned and will probably be succeeded by Mr. O. D. Richards.

—Mr. Charles O. Scull, General Passenger Agent of the Baltimore & Ohio, with headquarters at Baltimore, has resigned. His resignation took effect on April 15.

—Mr. B. T. Lewis has been appointed Assistant to General Manager J. J. Frey, of the Atchison, Topeka & Santa Fe, at Topeka, Kan., to succeed Mr. W. B. Jansen, promoted.

—Mr. E. S. Blair, formerly General Agent at Butte, Mont., for the Oregon Railway & Navigation Co., has been appointed General Agent for the Union Pacific at Helena, Mont.

—Mr. John T. Dressler, of Nebraska, has been appointed by the President a Government Director of the Union Pacific, to succeed J. Nelson H. Patrick, whose term has expired.

—Mr. Sidney Van Dusen has been appointed Traveling Passenger Agent of the St. Louis & San Francisco, with headquarters at Pittsburgh, to succeed Mr. W. F. Boyle, transferred.

—Mr. Calvin E. Stone, formerly City Ticket Agent of the St. Paul & Duluth, at St. Paul, has been appointed General Passenger Agent of the road, to succeed Mr. W. A. Russell, resigned.

—Mr. T. B. Bartholomew, one of the Board of Administration of the Southwestern Traffic Association, has been appointed Traffic Manager in Texas of the Malory Steamship Line.

—Mr. M. J. Todd has been appointed Agent of the West Shore at Cincinnati, to succeed Mr. O. W. Paxton, resigned to become Commercial Agent of the Baltimore & Ohio Southwestern.

—Mr. J. R. Wentworth has been appointed Superintendent of Car Service of the Missouri Pacific, with headquarters at St. Louis, Mo., to succeed Mr. C. W. Hequembourg, resigned.

—Mr. T. C. Sherwood, formerly Assistant General Manager of the Kansas City, Pittsburgh & Gulf, has been appointed General Manager of the Kansas City & Northern Connecting, with headquarters in Kansas City.

—Mr. W. S. Delery has been appointed Division Engineer of the Galveston, Harrisburg & San Antonio, and the Texas & New Orleans, with jurisdiction over the lines of these companies between Orange, Tex., and San Antonio.

—Mr. J. C. Bramhall, formerly City Passenger Agent of the Chicago, Burlington & Quincy at Alton, Ill., has been appointed Traveling Passenger Agent with headquarters at St. Joseph, Mo., to succeed Mr. H. D. Dutton, resigned.

—Mr. George Masson, who has been for the past 12 years Assistant Engineer in charge of the Western Division of the Grand Trunk, with headquarters at Detroit, Mich., has been retired under the policy of consolidating the engineering department of the Grand Trunk System.

—Mr. John K. McGowan, formerly Contracting Agent in Denver for the St. Louis & San Francisco, has been appointed General Agent at that place for the Chicago Great Western. Mr. H. B. Worden has been appointed Contracting Agent for the St. Louis & San Francisco, to succeed Mr. McGowan.

—Mr. George D. Wodley has been appointed General Superintendent of Construction of the Mexican National. Mr. Wodley was Chief Engineer and Superintendent of Construction of this road some five years ago, but since that time has been connected in different capacities with other roads.

—Following the announcement of the appointment of Mr. C. W. Eckerson as Master Mechanic of the Eastern Iowa Division of the Chicago, Burlington & Quincy, to succeed Mr. Joel West, deceased, which appears in another column, we learn that Mr. Eckerson died suddenly of heart disease on board a train on April 9. Mr. Eckerson was 55 years of age and was connected with the Chicago, Burlington & Quincy Railroad for 27 years.

—Mr. George Stephens, Division Freight Agent of the Philadelphia, Wilmington & Baltimore, died suddenly in his office, in Philadelphia, on April 7. The cause of his death was heart disease. Mr. Stephens was born in Philadelphia in 1847. He entered railroad service in 1861 with the Philadelphia, Wilmington & Baltimore, and remained with that company until April, 1880, when he became General Agent of the Eastern Shore Railroad. He returned to the Philadelphia, Wilmington & Baltimore and was appointed to his late position in October, 1882.

—Mr. Edward P. North, M. Am. Soc. C. E., who has been for some time past Water Purveyor of New York City, has been made Consulting Engineer to the Department of Public Works, succeeding Mr. Stevenson Towle, M. Am. Soc. C. E., who retires. Mr. Towle has been connected with the Department since 1870. Mr. North is succeeded as Water Purveyor by Mr. C. W. Barney, who was Chief Inspector of Street Openings. Mr. Wisner B. Martin, Asso. M. Am. Soc. C. E., succeeds Mr. Barney. He was assistant to the Water Purveyor. Mr. North in his new position will also act as engineer in charge of street openings.

—Mr. Albert Foster, Purchasing Agent of the Philadelphia & Reading, with headquarters in Philadelphia, died in the Continental Hotel in that city, on April 10. Mr. Foster was born July 14, 1842, at Philadelphia. He entered the employ of the Philadelphia & Reading in 1858, and remained with that company until the time of his death, filling in succession the offices of clerk in different departments, secretary of the branch corporations controlled by the company, Secretary of both the Coal & Iron and Railroad companies and Secretary for the Receivers, First Register and General Purchasing Agent. He was appointed to his late office in October, 1890.

—Mr. Isaac Odell, General Freight Agent of the Providence & Stonington Steamship Co., died April 11, at the age of 82 years. After being in charge of the Norwich Transportation Co., which operated a line of boats from New York as early as 1848, Mr. Odell was appointed Agent of the Commercial Steamboat Co., which began business in September, 1852, and ran a fleet of propellers between New York and Providence. The Commercial Steamboat Co. remained in existence until August, 1864, when it was succeeded by the Neptune Line, which enlarged its fleet to include a line to Boston. Mr. Odell acted as Agent, and superintended the construction of five steamers built by Messrs. John Van Dusen & Brother. The Neptune Line was dissolved in 1870, and was succeeded by the Merchant Steamship Co., which subsequently became the Providence & New York Steamship Co., and afterward, through consolidation with the Stonington Steamboat Co., what is now known as the Providence & Stonington Steamship Co. During all these years Mr. Odell was agent for the various companies in New York, doing his duty with faithfulness and ability, and making hosts of friends among the patrons of the line and the public generally. He was appointed General Freight Agent of the company last year.

—The office of general freight agent for a body of merchants appears to be growing in importance. Mr. A. J. Vanlandingham, of Kansas City, having been called to St. Louis at an increase of salary. He has been appointed Commissioner of the St. Louis Transportation Bureau, to take the place on May 1. Mr. Vanlandingham was formerly a railroad traffic officer and his success at Kansas City has been due to his experience in railroad service and to his tactful moderation in dealing with railroads. The St. Louis *Globe-Democrat*, reporting the appointment, says: There were 32 applicants for the position. Mr. Vanlandingham was not one of them and the offer came to him unsolicited. His present salary at Kansas City is said to be \$6,000. It was the original intention of the St. Louis people to pay \$5,000 for a manager, but it is understood that the appointee will get between \$7,000 and \$7,500. Mr. Vanlandingham has been Commissioner of the Kansas City Transportation Bureau since its organization in 1889, and has been successful in its management. He is one of the most widely known railroad men in the West. The bureau will be in the Merchants' Exchange and a rate clerk will be appointed soon. By the agreement between the Merchants' Exchange and the Business Men's League, each organization pays \$5,000 into the bureau fund. It is the intention to invite other bodies to join in the movement. The board will not attempt to secure results by aggressive measures, but will rather meet the railroads half way.

ELECTIONS AND APPOINTMENTS.

Atchison, Topeka & Santa Fe.—W. J. Ryus, formerly Assistant General Claim Agent, has been appointed General Claim Agent, with headquarters at Topeka, Kan., to succeed C. M. Foulks, resigned, and the former office has been abolished.

Baltimore & Ohio.—Frederick M. Giessen has been appointed Contracting Freight Agent at Cleveland, O.

Beaumont Wharf & Terminal.—A meeting of the stockholders of this company, which was recently incorporated in Texas, was held in Beaumont on April 2, and the following directors elected: W. S. Davidson, W. A. Fletcher, William Weiss, George W. O'Brien, S. H. Van Wormer, H. O. Cowles, George W. Carroll, W. W. Willson, F. A. Helbig, all of Beaumont, and L. P. Featherstone, of Galveston. The Directors elected: W. S. Davidson, President; W. W. Willson, Vice President; S. H. Van Wormer, Treasurer; F. A. Helbig, Secretary.

Canadian Pacific.—At the annual meeting of the stockholders, held in Montreal on April 7, the present officers and Board of Directors were re-elected.

Chicago, Burlington & Quincy.—The following appointments have been announced: C. W. Eckerson, Master Mechanic of the Eastern Iowa Division, with headquarters at West Burlington, Ia., to succeed Joel West, deceased; J. F. Deems, Division Master Mechanic at Beardstown, Ill., to succeed Mr. Eckerson, promoted; J. E. Button, Master Mechanic at Ottumwa, Ia., to succeed Mr. Deems, promoted.

Cleveland, Cincinnati, Chicago & St. Louis.—In consequence of the resignation of General Passenger Agent D. B. Martin, Warren J. Lynch, Assistant General Passenger Agent at St. Louis, has been transferred to Cincinnati and will take entire charge of the passenger and ticket department. William P. Deppe, Chief Clerk to Passenger Traffic Manager McCormick, has been appointed Assistant General Passenger Agent at St. Louis, to succeed Mr. Lynch.

Delaware Valley.—Officers of this company, recently formed in Stroudsburg, Pa., have been elected as follows: President, J. H. Shull; Secretary and Treasurer, A. M. Palmer. Directors, E. F. Peters, M. F. Coolburgh, William Hemmingway, of Brookline; Andrew Yetter, of Blairstown, N. J.; A. W. Loder, J. R. Rausberry, George Vauloby, John M. Hill and J. H. Shull.

Fort Worth & Rio Grande.—At the recent annual meeting held at Fort Worth, Tex., the following directors were elected for the ensuing year: H. B. Hollins, C. M. Wicker and W. F. Havemeyer, New York; Winfield Scott, John Hornby, John Peter Smith and K. M. Van Zandt, Fort Worth; and Brooke Smith, Brownwood. The directors elected as officers: H. B. Hollins, President; John Hornby, Vice-President and General Superintendent; A. K. Dixon, Secretary, and J. Van Rensselaer, Secretary.

Galveston, Houston & Henderson.—At the recent annual meeting of the stockholders the present Board of Directors was re-elected. The directors elected officers as follows: President, F. P. Olcott; Vice-President, John M. Duncan; Secretary and Treasurer, A. A. Van Alstyne; Assistant Secretary and Assistant Treasurer, H. B. Henson.

Gulf, Colorado & Santa Fe.—Lucius J. Polk, formerly Acting General Manager, has been appointed General Manager.

Houston & Texas Central.—At the annual meeting of stockholders, held in Houston, Tex., on April 5, the present officers and Board of Directors were re-elected.

Illinois Central.—J. M. Morrissey, formerly Traveling Passenger Agent at Omaha, Neb., has been transferred to Dallas, Tex., to succeed C. H. Morgan, resigned.

Long Island.—At the annual meeting of stockholders, held on April 13, the following Directors were elected: William H. Baldwin, Jr., Charles M. Pratt, Dumont Clarke, James G. K. Duer, Frank L. Babbott, Lewis Cass Ledyard, Theodore A. Havemeyer, August Belmont, George W. Young, Walter G. Oakman, James Timpon, Joseph S. Auerbach and Frederick G. Bourne. James G. K. Duer takes the place of H. H. Vreeland. Messrs. Baldwin, Pratt, Ledyard, Havemeyer, Belmont, Young and Oakman constitute the Executive Committee. The Directors elected W. H. Baldwin, Jr., President; C. M. Pratt, Vice-President, and A. C. Bedford, Secretary and Treasurer. C. L. Addison has been appointed General Roadmaster, in addition to his duties as Signal Engineer. He will have full charge of track and roadway work, with headquarters at Long Island City. J. H. Cummin has been appointed Superintendent of Bridges and Buildings, and will report to the Chief Engineer. Both appointments took effect April 1. These appointments apply also to the New York & Rockaway Beach and Prospect and Coney Island roads.

Missouri, Kansas & Texas.—At the annual meeting of stockholders, held at Parsons, Kan., on April 8, the following Directors were elected to serve until 1901: William Rockefeller, New York; Lee Clark, Parsons, Kan.; H. J. de M. Oyens, Amsterdam, Holland, and Myron T. Merrick, Cleveland, O.

Moscow & Eastern.—At a recent meeting of the stockholders of this road, recently organized in Idaho, directors and officers were elected as follows: Directors: George Creighton, F. E. Cornwall, T. G. Rice, F. N. Gilbert, C. O. Brown, K. O. Skattaboe and B. Hodgins; President, George Creighton; Vice-President, F. E. Cornwall; Secretary, B. Hodgins; Treasurer, F. N. Gilbert; General Manager, C. O. Brown; Attorney, R. V. Cozier.

Northern Steamship Co.—The principal office of the company was removed from Duluth, Minn., to Buffalo, N. Y., on April 1. Vice-President W. C. Farrington will have full charge of the company's property and business, with headquarters at Buffalo.

Pemberton & Hightstown.—At the annual meeting of stockholders held in Camden, N. J., on April 8, the present officers and Board of Directors were re-elected.

Pittsburgh, Bessemer & Lake Erie.—At the annual meeting of stockholders held in Pittsburgh, April 6, Directors were elected as follows: Andrew Carnegie, Samuel B. Dick, John Dick, H. C. Frick, T. H. Given, A. C. Huidekoper, A. W. Mellon, Edwin S. Mills, J. Edward Simmons, Charles Stewart Smith, Thomas H. Wells, J. T. Odell and William N. Frew, in the place of J. G. A. Leishman. At a subsequent meeting of the directors all of the present officers of the road were re-elected.

Sherman, Shreveport & Southern.—At the annual meeting of stockholders, held in Greenville, Tex., on April 7, Directors were elected as follows: C. S. Cobb, Tom Randolph, W. B. Munson, T. H. King, W. A. Williams, W. T. Atkins, H. W. Poor. The directors elected officers as follows: H. W. Poor, Chairman of the Board; W. B. Munson, President; T. H. King, Vice-President; H. N. Marache, Secretary; J. T. Roberts, Treasurer; E. M. Alford, Superintendent; J. W. Chatham, Freight and Passenger Agent.

Southern Pacific.—At the annual meeting of stockholders, held on April 7, the present Board of Directors was re-elected, with the exception that Julius Kruttschnitt, General Manager of the company, was elected to succeed the late A. L. Tubbs. C. H. Markham has been appointed District Freight and Passenger Agent of the Pacific System, with headquarters at Fresno, Cal., in charge of freight and passenger traffic of the territory south of Stockton, Lathrop and Tracy to Mojave, inclusive.

Staten Island.—The following Directors were elected on April 7: James J. Winants, Charles H. Bass, James M. Fitzgerald, William King, J. Frank Emmons, A. Horrmann, E. P. Goodwin, Charles F. Zentgraf, Frank H. Curry, C. H. White, L. Dejonge, Jr., K. P. Emmons and George F. Kreischer.

Sterling Mountain.—At the annual meeting of stockholders, held in New York on April 6, the following trustees were elected: William B. Anderson, Jay Cook, Jr., James P. Scott, Victor Guillon, Peter T. Barlow, James Day Roeland, Benjamin Moffatt and Benjamin Moffatt, Jr.

Wabash.—J. S. Goodrich has been appointed Superintendent of the Western Division, with office at Moberly, Mo., to succeed W. A. Garrett, transferred. W. A. Garrett has been appointed Superintendent of the Middle Division, with office at Decatur, Ill., to succeed J. S. Goodrich, transferred.

Wheeling & Lake Erie.—E. B. Coolidge has been appointed General Agent, with headquarters at Detroit and R. E. Lawrence has been appointed General Agent at Wheeling.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

Beech Creek.—A contract was awarded on April 8 for grading 30 miles of this road in Indiana County, Pa. The road has already been built to Mahaffey in Jefferson County. Several routes have been surveyed from Saltsburg, Indiana County, to Pittsburgh, but none have yet been agreed upon. It is expected, however, that the route leading from Saltsburg to Latrobe will be selected, connection being made with the Pittsburgh & Lake Erie at a point near West Newton.

Clarion, Hampton & Western.—Right of way for this road, which is proposed from Hampton, Ia., the present terminus of the Chicago Great Western in that state, southwest 38 miles to Webster City, has been obtained from Hampton to a point within 14 miles of Webster City, and the company has asked the citizens of the latter place to purchase the right of way for the remainder of the line. A meeting of the citizens was held recently and a committee was appointed to solicit the necessary funds, which will be about \$10,000. The proposed road is to connect at Webster City with the Crooked Creek line, which runs from that place to the Lehigh coal fields.

Cleveland & Pittsburgh.—Ohio newspapers report that an extension is proposed to the New Philadelphia

branch at New Philadelphia, southeast about six miles into the Beaver Dam Valley, a rich coal district. Part of this projected branch has been surveyed and right of way is now being secured. It is expected that the new line will be pushed through at some future date to a connection with the Pittsburgh, Cincinnati, Chicago & St. Louis, at Uhrichsville, which is about seven miles further southeast.

Coast Railway of Nova Scotia.—This road, which is proposed to connect Yarmouth with Lockport, N. S., has been graded for a distance of 32 miles out of Yarmouth, and rails have been laid over 20 miles of that distance. There are on the spot 1,000 tons of rails which, it is estimated, will carry the line to Lower East Pubnico. It is expected that the road will be completed to Lockport during 1898, and that it will be subsequently extended to Halifax, about 100 miles. The Nova Scotia Development Co. has the contract for building the line, and all steel bridges will be built by the Central Bridge Co., of Peterboro, Ont.

Colorado Valley.—This road is proposed from Colorado, Tex., a point on the Texas & Pacific, southeast to San Angelo, Tex., the terminus of the Gulf, Colorado & Santa Fe, a distance of about 75 miles. W. Wheatcroft, General Manager, Robert Lee, Coke County, Tex., states that preliminary surveys of the line have been made and that a contract for its construction is soon to be let, work to be begun immediately after the contract is closed.

Dayton Northern.—Work on this road, which is to extend from Wayne street, Lima, O., east about one mile to the Lima Northern tracks, was begun at Lima on April 7, and will be pushed rapidly to completion. It is said that the road will be extended south to Dayton, the line to begin at Minster, a point on the Lake Erie & Western southeast of Lima, and to extend thence through Sidney, Piqua, Troy and Tippicanoe to Dayton.

Delaware Valley.—This company has recently been formed in Stroudsburg, Pa., to build a road from that place, through Monroe and Pike counties, in a general northeasterly direction to Port Jervis, N. Y. It is said that an effort will be made to acquire the charter of the old Matamoras & East Stroudsburg Railroad, which is held by Simon Friedenberger, of Germantown. At a meeting held recently in Stroudsburg, the officers were elected whose names are given in another column.

Kanona & Prattsburgh.—This company has been incorporated at Albany with a capital stock of \$120,000 to operate the property and franchises of the Kanona & Prattsburgh Railroad Co., in Steuben County. The incorporators are: L. V. P. Randolph, J. L. Suydam, William Carpenter, H. V. Post, Joseph McNamara, L. M. Jones, C. P. Pomeroy, J. W. Fowler and W. H. Nicholas. The road extends from Kanona to Prattsburgh, 11.5 miles. A Receiver was appointed on June 1, 1892, and the road was sold on Feb. 1 of the following year.

Mexican Roads.—Robert G. Towne, President of the Mexican Ore Co., has obtained a concession from the Mexican government to build a railroad from San Luis Potosi southwest about 160 miles to the Rio Verde District, the location to be subject to approval by the Department of Communications and Railroads.

A contract has been given for building a railroad from Saltillo, Mex., in a general northerly direction about 125 miles to Trevino, a town on the Mexican International. The government of the state of Coahuila has granted a cash bonus of \$100,000 for building this road. It is expected that construction work will be begun immediately.

Milwaukee & Superior.—Location surveys have been made for an extension of this road from Sussex, west 10 miles to North Lake, and bids for grading are now being received. It is proposed to begin work as soon as right of way has been obtained. A. H. Hadfield, Milwaukee, Wis., is General Manager.

Monroe, Fort Smith & Northwestern.—This company has recently been organized at Monroe, La., with a capital stock of \$4,000,000. It is proposed to build a railroad from Monroe in a general northwesterly direction, through Farmerville and into Arkansas, to Fort Smith, opening up a rich farming and timber country. Officers of the company have been elected as follows: President, E. Fudicker; Vice-President, J. S. Handy; Secretary, J. M. Keller; Treasurer, Moses Elder.

Montgomery, Hayneville & Camden.—The contract for building this road, which is proposed from Montgomery, Ala., in a general southwesterly direction to a point on the Gulf of Mexico, passing through Hayneville and Camden, was let on April 13 to Joseph Gianini & Co., of Pittsburgh, Pa. The road will be about 100 miles long and it is expected that it will be completed in about a year. About 11 miles were graded out of Camden in the summer of 1894.

Montgomery, Tuscaloosa & Memphis.—The Hanover Construction Co., which has the general contract for building this extension of the Mobile & Ohio from Montgomery to Columbus, Miss., has sublet contracts as follows: Grading, G. B. Wilkins & Co., New York, 18 miles; P. Cassidy & Co., Little Rock, 10 miles; Abercrombie & Williams, Montgomery, Ala., 5 miles; G. W. Calahan & Co., St. Louis, 20 miles; T. F. Ryan, Kansas City, 5 miles; Mason, Hoge & Co., Chicago, 12 miles; Shea & Co., Knoxville 8 miles; Perin & Co., Birmingham, 10 miles. Trestling, piling and crossings from Columbus to Tuscaloosa, Ala., to Gianini & Co., Pittsburgh, Pa.; trestling and ties from Tuscaloosa to Montgomery, to E. M. Quigley & Co., St. Louis. The contracts for masonry work on five bridges will be let at Tuscaloosa on April 25. Chief Engineer H. P. Farrar, who is in charge of the work, has announced that the grading, bridging and tie-laying must be completed by Oct. 1, and tracklaying must be finished and the road ready for operation by Oct. 15.

Moscow & Eastern.—This company has recently been organized in Idaho to build a railroad from Moscow, Idaho, in a general easterly direction about 35 miles into extensive white pine forests in Latah and Shoshone counties. Preliminary surveys will be begun and right of way obtained as soon as the weather will permit, the snow being now too deep for such work. At a meeting of the stockholders, held recently, the officers and directors were elected, whose names are given in another column.

New Mexico & Western.—This company has recently been incorporated in New Mexico, with a capital stock of \$2,500,000, by Edward H. Smith, G. N. Latimer, R. L. M. Ross, T. W. Hayward and Jacob Riehl. It is proposed to build a road from Maxwell City, in Colfax County, a station on the Atchison, Topeka & Santa Fe, in a general easterly direction to Cimarron River, thence across the Moreno Valley and through Taos Pass to a point on the Rio Grande, a total distance of 82½ miles. A five-mile branch north to Baldy, and another branch 12½

miles long to Elizabethtown and Red River City are provided for.

New Roads.—Local newspapers report that a company has been organized in Wyoming to build a road from a connection with the Union Pacific at either Fort Steele or Walcott, Carbon County, Wyo., in a general southeasterly direction, up the North Platte River about 75 miles to the gold fields recently discovered in the vicinity of the Grand Encampment. The proposed line will pass through Saratoga, and a branch is to be built up Brush Creek to the mines in that district.

Surveys are now being made for a railroad which is projected from New Buffalo, on the Chicago & West Michigan, in the extreme southwestern part of Michigan, in a general westerly direction about 45 miles to Hammond, in the extreme northwestern part of Indiana, passing along or near the shores of Lake Michigan.

Surveys are being made for a road which is proposed from Lewishurg, Pa., in a general northwesterly direction, about 13 miles, to reach a tract of timber land recently purchased by Monroe H. Kulp & Co.

Pecos Valley Railway, Construction & Land Co.—This company has recently been incorporated in New Mexico to build an extension of the Pecos Valley Railroad from Roswell, N. Mex., in a general northwesterly direction about 22½ miles to either Amarillo, Washburn or Panhandle City in the Texas Panhandle. The capital stock is \$100,000 and the incorporators are W. F. Greenwood, H. J. Hagerman, William H. Jones, John S. Hunt and L. A. Burlin. The Pecos Valley Railroad now extends from Pecos, Tex., north 164 miles to Roswell.

Queen Anne's.—This road was formally opened between Queenstown, Md., and Greenwood, Del., on April 8, when an excursion was given to prominent men of the vicinity over the new line. Work is being pushed rapidly between Greenwood and Lewes, which is to be the eastern terminus.

Tennessee & Northern.—This company has recently been incorporated in Tennessee to build a road from Tennessee Ridge, a point on the Louisville & Nashville in Houston County, north about 20 miles to Bear Springs Furnace, in Stewart County. Preliminary surveys of the line have already been made. It is expected that the road if built will open up rich agricultural and mineral lands. An extension of the road may ultimately be made from Bear Springs Furnace, northwest about 5 miles to Dover. The incorporators are: W. M. Barradale, John H. Lory, Michael Savage, H. N. Leech and J. Ferguson.

Washburn, Bayfield & Iron River.—It is announced that arrangements have been completed for building a part of this proposed line and that work will begin about May 1. The main line will extend from Washburn southwest about 26 miles to Iron River, and a branch will be built north about 13 miles to Bayfield, through the Red Cliff Indian Reservation. A portion of this branch line has already been graded. A second branch is proposed from Bayfield to Buffalo Bay. The road is expected to ultimately connect St. Paul and Minneapolis with Lake Superior. Messrs. R. D. Pike and George Best, of Bayfield, are interested.

Electric Railroad Construction.

Asbury Park, N. J.—The Atlantic Coast Electric Railway Co. proposes to extend its electric road from Asbury Park to Belmar, where it will connect with the projected road from Belmar to Point Pleasant. As at present planned, the line will parallel the Ocean Grove & Belmar Railroad.

Baltimore, Md.—Surveys for the Columbia & Maryland Railroad have been practically completed and the company will be reorganized, so that the construction work may begin very soon. It appears that some of the old contracts have been renewed, but new ones will also be let. The proposed length of the road is 36¼ miles and double track, a portion of which, it will be remembered, was completed before the company went into the hands of Receiver Shoop.

The Central Railway Co. is rapidly completing the work on the East Baltimore extension, previously mentioned among our notes.

Buffalo, N. Y.—The Buffalo Traction Co. has filed a preliminary map showing the route of the proposed new lines which the company will build this summer. Forty-year bonds are to be issued at the rate of \$50,000 a mile. The interest on these bonds is to be paid semi-annually at the rate of 5 per cent.

The Mayor has signed the resolutions for the extension of the franchise of the Crosstown Street Railway Co., on some of the principal streets and avenues.

The Buffalo, Niagara River & Grand Island Railway Co. has been incorporated at Albany to operate a street surface electric road from Buffalo to Tonawanda. The directors include: D. A. Craig, W. E. Pench, G. A. Ricker, J. H. Metcalf, H. P. Bissell and Frank W. Carr, of Buffalo. The capital is \$30,000.

Chicago, Ill.—The North Shore Interurban Railway Co. was incorporated on April 7 with a capital stock of \$340,000. The new line will connect with the northern suburb of Highland Park, making a total length of 17 miles. The total population of the towns along the route is nearly 60,000, franchises through which have been secured in all the places except Lake Forest.

The General Electric Railway Co. is asking for bids for the construction of its proposed lines in Chicago. Perry A. Hull, Counsel, Chicago, Ill., may be addressed.

Cincinnati, O.—Surveys have been completed for the Westwood loop, which is to be 4½ miles in length. A contract has been awarded to Royce & Heffron, who began the work the first of this week.

Columbia, S. C.—The Brookland Railroad will be built at once. The line will be 4 miles in length and of thorough construction throughout. J. T. Sloan, Vice-President of the Brookland Railroad Co., Columbia, S. C., may be addressed in regard to the contracts.

Corning, N. Y.—The Corning Construction Co. has been granted a franchise to build an electric railroad in Corning. The company has not as yet accepted the conditions imposed by the Council, but with a few modifications the matter will probably be adjusted and the road will be built.

Exeter, N. H.—The incorporators of the electric road between Exeter and Hampton have authorized the Directors to contract for the building of the road, which must be completed by April 1, 1898.

Hamburg, N. Y.—The Buffalo, Hamburg & Aurora Railway Co. has been incorporated by William H. Wheatley, of Brooklyn, and William J. Wright, of Buffalo, to build an electric road. Capital stock, \$200,000.

Louisville, Ky.—The Metropolitan Railway Co. has

been incorporated by Thomas F. Hargis, of Louisville; J. W. Woolfolk, of Montgomery, Ala., and others. It is proposed to build a number of lines in Louisville.

Manchester, N. H.—The Goffstown & Manchester Railway Co. has been incorporated to build an electric road between Goffstown and Manchester, a distance of about 12 miles.

Nassau, N. Y.—The Board of Directors of the Greenbush & Nassau Electric Railway Co. has decided on the route of its proposed line, mentioned in our issue of March 19. The grade will not exceed 4½ per cent. A committee was appointed to secure right of way.

New Milford, Conn.—Surveys were begun on Monday of this week for the electric road between New Milford and Lake Waramaug. The length of the road will be about eight miles.

Patchogue (L. I.), N. Y.—Surveys have been completed and the right of way secured for an electric road for the Patchogue & Port Jefferson Traction Co., and contracts will be let soon. The present route, as proposed, is from Patchogue to Canaan, Waverly, Seldon, Terryville and Port Jefferson. The length of the road will be about 15 miles.

Penn Yan, N. Y.—Surveys have been nearly completed and plans are being prepared for the Penn Yan, Keuka Park & Branchport Railroad, reference to which we have previously made in these columns. Franchises have been secured for the entire length, eight miles. Information may be obtained from F. H. Viele, Secretary, Corning, N. Y.

Providence, R. I.—At a meeting of the directors of the Woonsocket Street Railroad Co., held April 5, it was voted to build a 4 mile extension to Sletersville, provided satisfactory arrangements could be made with the North Smithfield town authorities.

St. Louis, Mo.—The North St. Louis Improvement Association proposes to organize a company with a capital stock of \$500,000 to build an electric road from North Market street to the city limits.

Torrington, Conn.—The power-house of the electric road between Torrington and Winsted, referred to among our notes last week, will be located at Burrville and work on the building will be begun in a short time, and the road is now being built. It is expected that the line to Winsted will be opened by July 1. The capital stock will be \$175,000.

Washington, D. C.—The Washington & Gettysburg Railway Co. has been incorporated by C. W. Cissel, E. P. Berry, John F. McCoy and others, with a capital stock of \$100,000. The franchise has been refused on account of the objections to build an electric road on the Gettysburg field. At present there is an electric line running over the field and further extensions of this line or the construction of a new line are strongly objected to by many who have an interest in the battlefield as a point of historical interest.

GENERAL RAILROAD NEWS

Central of New Jersey.—A resolution providing for the appointment of a special committee to enquire into the relations between this company and the Lehigh & Wilkes-Barre Coal Co. was offered in the Pennsylvania Senate on April 6. The resolution declares that the coal company is owned, controlled and operated by the railroad company; that the coal company is a Pennsylvania corporation, with a capital stock of \$10,000,000, and owner of extensive coal and timber lands; that according to the official report of the railroad company, the coal company returned it a net profit in 1896 of more than \$800,000 and in 1893 more than \$1,400,000; that since 1893 the officers of the road have refused to publish information in regard to the coal company. It is further declared that the railroad company has placed a large amount of indebtedness on the coal company, which is in reality its own debt, and that the investing public has a right to know whether the large bonded indebtedness which the road claims to hold against the coal company is not for the purpose of absorbing the surplus earnings of that company and to avoid taxation in Pennsylvania. It is declared that the railroad company holds \$28,800,000 of the debt of the coal company, that a large amount of interest coupons remain due and unpaid, and that demand notes to the value of \$3,000,000 are also hanging over the coal company. The resolution was referred to the Committee on Corporations.

Chattanooga & Durham.—This is the name under which the Chickamauga & Durham has been reorganized by the purchasers, Messrs. Simon Borg & Co., of New York, and others. The road was sold in consequence of a decree of foreclosure entered on the application of the Central Trust Co. of New York. The road extends from Chickamauga to Durham, N. C., and is 17 miles long. It enters valuable coal lands, and is operated in connection with the coal company at Chickamauga. J. W. English, of Atlanta, has been elected President, and Paul J. Murphy General Manager.

Duluth & Iron Range.—This company has issued first mortgage bonds for \$500,000 on all its swamp land grants, conveying the land in trust to Walter F. Cobb, of Chicago, as security. The mortgage sets forth that by an act of the legislature approved in 1875 there was granted to the road for the purpose of aiding it to build its line an amount of swamp land equal to 10 sections for each mile of road built, the land to be selected within 10 miles on each side of the right of way. The instrument further states that the road has decided to issue \$500,000 in first mortgage registered land grant bonds in amounts of \$5,000 each, for the purpose of paying off or funding outstanding indebtedness, making improvements, or other corporate purposes. The bonds are secured by all the swamp land owned by the road on March 1, which was not used by the road itself. They are to run for 20 years, with interest at five per cent.

Emmitsburg.—The Circuit Court at Frederick, Md., has, in accordance with a bill of complaint filed on April 10, named John C. Motter, Vincent Sebold, J. R. McSherry and I. S. Annan trustees to sell this road, which extends from Emmitsburg, Frederick County, Md., to a connection with the Western Maryland Railroad at Rocky Ridge, about eight miles. There is seven years' arrears of interest on the bonded debt of the company, which amounts to \$121,850, and the Court orders that unless the interest is paid by May 1, the road, the rolling stock and all the franchises of the company shall be sold by the trustees for the benefit of the creditors.

Gulf & Interstate.—The Texas Railroad Commission has approved the issue of \$250,000 in bonds by this company for the purpose of thoroughly equipping its road and improving the terminal facilities at Port

Bolivar, Tex., where it owns 3,000 ft. of water front. The aggregate bond issue of this company is \$7,000 per mile. The road is projected from Galveston in a general northerly direction to Red River, with a branch from Winnie to Beaumont, a total distance of about 405 miles. On March 15 it was completed from Port Bolivar to Beaumont, about 70 miles, and this portion is now in operation.

Illinois Central.—The earnings for the eight months ending Feb. 28 were:

	1897.	1896.	Inc. or Dec.
Gross earn.....	\$15,131,037	\$15,304,702	D. \$173,665
Oper. expen.....	10,415,911	9,949,629	I. 466,282
Net earn	\$4,715,126	\$5,355,073	D. \$639,947

The gross earnings for March, 1897, are estimated at \$1,736,161, as against \$1,724,831 in March, 1896, an estimated increase of \$11,330.

Jacksonville, Tampa & Key West.—Special Master Eagan, having failed to sell this road on April 5, has given notice that the property will be again offered on May 3. It is to be sold subject to about \$2,250,000 of claims of the first mortgage. This is the fifth postponement of the sale.

Lehigh Valley.—Formal announcement was made on April 13 by the company of the completion of the sale to Drexel & Co. of \$5,000,000 of the bonds of the company, under the conditional agreement of March 9. The proceeds of the bonds will be used to pay the entire floating debt of the company and to provide working capital. An account of the general arrangement was given in our issue of March 12.

North Carolina.—The injunction case of the Southern Railway and the Central Trust Co. against this company, in the United States Court at Greensboro, N. C., has been postponed until June 8, by reason of the request of the newly appointed Board of Directors to be made parties defendant. The case will be heard at the Asheville Court.

Owensboro, Falls of Rough & Green River.—This road was sold on April 10 to the Illinois Central Railroad for \$150,000. The road extends from Owensboro to Horse Branch, Ky., and is 42 miles long. It has been controlled by the Chesapeake, Ohio & Southwestern, which owns a majority of the capital stock, having acquired the same under an agreement whereby the latter company guaranteed payment of principal and interest of not exceeding \$900,000 first mortgage five per cent. bonds of 1942. The road went into the hands of a receiver on April 1, 1894.

Pittsburgh, Bessemer & Lake Erie.—At a meeting of the stockholders, held in Pittsburgh on April 10, it was decided to issue \$10,000,000 of bonds, which will be secured by a mortgage on the property and franchises of the company.

St. Joseph & Grand Island.—Judgment for \$5,523,933 has been ordered by Judge Sanborn in the United States Court at St. Paul against this road, in the suit which was brought by the Central Trust Co. of New York, and the judgment is to be executed at once. The judgment is given to the complainant as the trustee for the holders of the first mortgage bonds. The suit was brought for a deficiency which existed after foreclosure by the same company, in consequence of which the road was sold last December for \$3,000,000 to a committee of the stockholders.

Summit Branch.—A committee consisting of Messrs. E. B. Morris, W. D. Winsor and George Wood, which was appointed to investigate the recent defaults of the company, has made its report to the security holders. It was found that the liabilities consist of \$1,075,000 of seven per cent. coupon bonds and judgment amounting to \$121,040. There are also claims amounting to \$30,000 that may have to be settled. The amount of cash to be provided amounts to \$550,000. The assets of the company consist of 11,488 acres of land, of which a part lie within the coal measures. The business tabulation shows that during the 10 years the average net earnings were about equal to five per cent. of the funded debt now existing. The committee proposes the following plan of reorganization: To purchase the property and to organize and place the title to all the lands of both companies in one new corporation which shall create a first mortgage covering all property of both existing corporations and not exceeding \$1,400,000 of five per cent. gold bonds running 30 years, with a sinking fund of three per cent. on net earnings, and to issue one of such bonds in place of every existing first mortgage bond surrendered to the committee with its unpaid coupon, leaving \$325,000 in the treasury for future use. William J. Howard, Trustee, has advertised that the road and all other property of the company will be sold at auction at Philadelphia on July 13.

Tennessee Central.—The sale of the above road, which was to have taken place at Crossville, Tenn., on April 5, has been postponed at the request of about two-thirds of the creditors. Representations have been made to Chancellor Fisher that reputable and responsible parties stand ready to bid on the road, but it is stated that an acceptable bid is not likely to be made with the existing uncertainty relative to the priority of the different claims against the road. The Chancellor has, therefore, ordered the Clerk and Master at Crossville, Tenn., H. G. Dunbar, to report to him regarding all claims on file, such report to be made to the next special or regular term held by the Chancery Court. It is now expected that the sale will take place some time in May. The road was described in our issue of Feb. 5.

Union Pacific, Lincoln & Colorado.—At the request of a large holding of first mortgage six per cent. bonds a committee consisting of Charles E. Cotting, Charles S. Tuckerman, James Jackson and William E. Glyn has consented to act for the protection of their interests. An agreement has been prepared under the terms of which holders of the first mortgage bonds are invited to deposit the same with the Old Colony Trust Co. of Boston or the Guaranty Trust Co. of New York, which companies will in turn issue negotiable receipts. The time for receiving these bonds has been limited to June 1.

Electric Railroad News.

Baltimore, Md.—Nothing has been definitely decided in regard to the consolidation of the Baltimore street railroads, but the negotiations are still pending. The present plan is to bring the Consolidated Traction Co., the City & Suburban Railway Co., and the Baltimore Passenger Railway Co. under one management.

Burlington, Ia.—The Burlington Electric Railway was sold to a syndicate of Boston men, April 10, for \$50,000. It is said that \$100,000 will be spent on improvements on it this spring.

Hamilton, Ont.—The Hamilton Radial Electric Railway Co. reports profits for March of \$400. Four new cars with smoking compartments will be put on the road May 1, and a 15-minute service will be started. Among the newly elected directors are: A. Turner, T. Leather and J. Dixon.

Kansas City, Mo.—The West Side Street Railway Co. has filed notice of an increase of capital stock from \$20,000 to \$100,000.

Oshkosh, Wis.—The proposed electric road in Oshkosh will probably be built this summer. A mortgage to the amount of \$200,000 upon the property of the Citizens' Traction Co. has been given to the New York Security & Trust Co.

St. Louis, Mo.—A part of the stock of the Southern Electric Railway Co. has been sold to Louisville, Ky., parties. The company has reorganized with Charles F. Orthwein, President, and a number of new directors have been chosen.

TRAFFIC.

Traffic Notes.

The Utah-Colorado Passenger Association has shut up shop.

The Delaware, Lackawanna & Western and the New York, Chicago & St. Louis now run through sleeping-cars, one a day each way, between New York and Chicago.

The city ticket agents of the Missouri Pacific and of the Burlington, at Kansas City, have been arrested for "keeping an office for the sale of railroad tickets without a license."

The boatmen on the Erie Canal are said to have agreed upon 3½ cents a bushel as the rate to be charged on wheat from Buffalo to New York the coming season, and they have agreed to load in turn at the Buffalo elevators.

The Wisconsin Central's rail and lake line between Manitowoc and Buffalo is formed by a combination with the Great Lakes Steamship Co. Four steamers have been placed upon this line, and there will be at least two sailings a week each way.

The managers of the Joint Traffic Association have recommended differentials in passenger fares between New York and Cincinnati and New York and St. Louis, on the same basis as that recommended by the arbitrators for the fares between New York and Chicago. To Cincinnati the standard time of trains is 23½ hours and to St. Louis 33 hours; for each hour quicker than the standard, one dollar will be added to the fare. Fares to intermediate points are to be adjusted proportionately.

The Joint Traffic Association.

A meeting of the Board of Control was held April 13, and the counsel of the Association advising that the articles of agreement were not illegal, the following resolution was adopted:

Resolved, That after hearing the opinion of counsel, and acting under their advice as to the validity of our articles of association, and the conduct of our business under it, pending the final decision by the Supreme Court, we, the members of this association, believe that under our agreement we are acting in the public interests, that we are conserving and protecting the interstate commerce of the country from demoralization fatal to legitimate business and its prosperity, and that we are carrying out and enforcing the letter and spirit of the Interstate Commerce act, hereby pledge ourselves to maintain and carry out the provisions of the articles of organization of the Joint Traffic Association.

The rate situation was briefly discussed but no definite action was taken, the Managers having everything well in hand. The Commissioner was requested to refer the majority and minority reports relating to the dimensions of freight cars to the American Railway Association.

Chicago Traffic Matters.

CHICAGO, April 14, 1897.

Navigation practically opened up on Friday last, and active preparations are now being made for getting the grain fleet started east from Chicago. The Board of Trade report of eastbound shipments shows the tonnage for the week ending April 8 as 3,519 tons. All-rail business is already feeling the effect of the water competition. The preparations made by the Baltimore & Ohio railroad to put a new fleet in service have created some disturbance, and the Anchor line will compete with the Baltimore & Ohio boats as sharply as possible. The freight service of the Northern Steamship Company will begin April 20, when the first boat will sail from Duluth. The Baltimore & Ohio has made arrangements with the Northern for through rates between Fairport and Duluth. The Baltimore & Ohio has announced a list of 24 private docks in Chicago at which, in addition to its docks at Illinois street, it will make free calls and delivery on carload freights.

Commissions on immigrant business are again making a disturbance. It is the same old trouble, the refusal of the Southern Pacific to go into the Western Immigrant Clearing House. In diverting business it has been paying excessive commissions and now the other Western roads, taking advantage of the collapse of the Passenger Association, are said to be offering commissions of all kinds.

The reduction in the rate on wheat made by the Chicago Great Western from Southwestern Missouri River points to Chicago (to 10 cents) and afterward met by the other lines, is to be cancelled April 22.

Eastbound shipments from Chicago and Chicago Junctions to points at and beyond the Western termini of the trunk lines for the week ending April 8 amounted to 85,069 tons, as compared with 90,955 tons the preceding week. This statement includes 32,074 tons of grain, 13,422 tons of flour and 9,793 tons of provisions, but not live stock. The following is the statement in detail for the two weeks:

Roads.	WEEK ENDING APRIL 8.		WEEK ENDING APRIL 1.	
	Tons.	p. c.	Tons.	p. c.
Baltimore & Ohio.....	5,273	6.2	5,591	6.2
C. & C. & St. Louis.....	3,680	6.7	5,948	6.5
Erie.....	9,532	11.0	10,836	11.9
Grand Trunk.....	5,952	7.0	6,111	6.7
L. S. & M. S.....	8,254	9.7	7,373	8.1
Michigan Central.....	22,535	26.5	19,721	21.7
N. Y., Chi. & St. L.....	6,553	7.7	11,252	12.4
Pitts., Cin. & St. Louis.....	7,073	8.3	8,593	9.5
Pitts., Ft. Wayne & Chicago.....	8,879	10.4	8,228	9.0
Wabash.....	5,509	6.5	7,302	8.0
Totals.....	85,069	100.0	90,955	100.0